

December 1950

Agriculture

*The Journal of the
Ministry of Agriculture*



VOL. LVII

No. 9

PUBLISHED 6^d MONTHLY

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Lessons from the Counties



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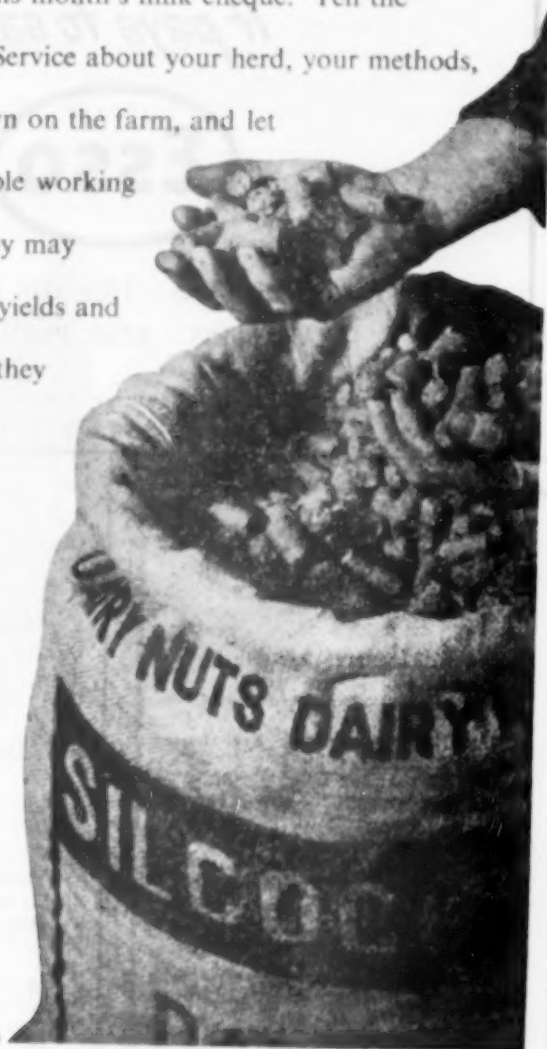
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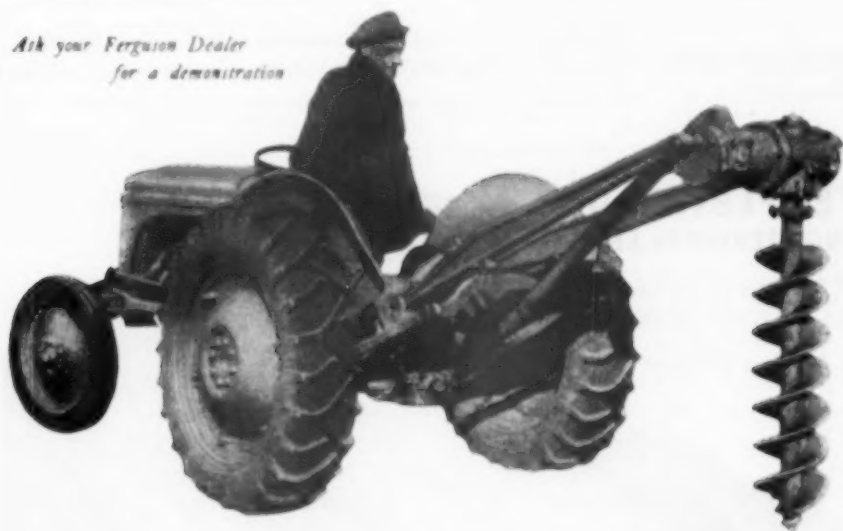
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AGRICULTURE

THE JOURNAL OF THE MINISTRY OF AGRICULTURE

Editorial Offices: St. Andrew's Place, Regent's Park, N.W.1 (Phone: WELbeck 7711)

VOL. LVII

No. 9

DECEMBER 1950

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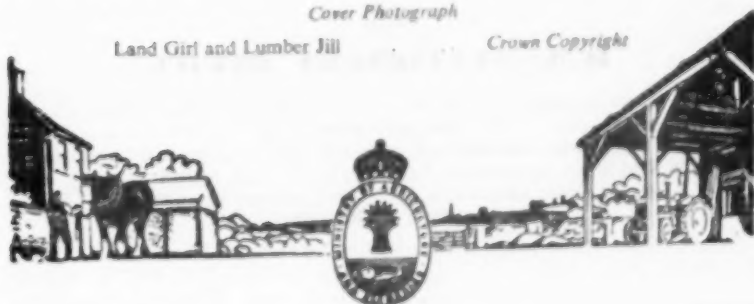
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AGRICULTURE

THE JOURNAL OF THE MINISTRY OF AGRICULTURE

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Pride in Achievement

Speech by Her Majesty The Queen, at the Farewell Parade of the Women's Land Army, Buckingham Palace, October 21, 1950



I AM so very pleased to have this opportunity of speaking to the Women's Land Army, whose Patron I have been for the past nine years.

A Farewell Parade always has something about it that is sad, but when it marks the culmination of a long and honourable history, our feelings are chiefly of pride and gratitude. This is certainly so today.

The story of the Land Army has been one of a great response by the women of our country to the call of duty in the nation's hour of danger and need.

They could not have done more for their country than they did. By their efforts they helped to ensure that our country contributed its utmost towards its food supplies, and for this the nation owes them an everlasting debt.

The Women's Land Army has always been recruited from volunteers, and I like to think that its greatest strength lay in the free spirit which has always inspired the people of these Islands to their greatest achievements.

The Land Army attracted girls from every kind of different occupation, and I have always admired their courage in responding so readily to a call which they knew must bring them not only hardship and sometimes loneliness, but often danger.

By their hard work and patient endurance they earned a noble share in the immense effort which carried our country to victory. Yet their task did not end when the war was over, for they stayed at their posts through the difficult years that followed.

Five thousand of those who served in the Land Army have decided to remain on the land. There can be no greater tribute than this to the happiness with which their work rewarded them.

PRIDE IN ACHIEVEMENT

Now the time has come to say good-bye, because the job has been done, but the sadness which many will feel at the parting, should be outweighed by pride in the achievement. Moreover, the Land Army will not, in any case, be only an affectionate memory, since it will live still in the shape of the thousands of members who have settled down in the countryside as the wives of farmers and farm workers, or who are themselves continuing to work in agriculture when the Organization itself comes to an end.

I thank you for all the splendid service you have given your country. In field and forest, garden and orchard and dairy, the work of the Women's Land Army has always been worthy of the ageless traditions of those who have toiled for the land they loved.

I know that the whole nation will join with me in wishing you all good fortune for the future.

MESSAGE FROM THE MINISTER OF AGRICULTURE AND FISHERIES

I WELCOME THE opportunity to send a personal message to all members and officers, past and present, of the Women's Land Army on its formal disbandment.

First, I should like, on behalf of the Government and my Department, and for myself, to thank you all warmly for your unstinted service in the days of national danger and through the difficult years of post-war recovery, and to offer you my best wishes for the future. The eleven years of the W.L.A.'s existence have coincided with a period of great changes in agriculture, which has been and still is faced with an immense task of food production vital to our national well-being. Your share in that work has been done in a spirit equal to the importance of the events of our time, and you can look back on your achievement with justifiable pride. It is my belief, and certainly my hope, that you have found on the land to which you gave your services so freely the sense of fulfilment which comes from a job well done.

To those of you who have decided to stay on the land, I would say that a great start has been made along the right road for agriculture—indeed we may claim that there has been a revolution in mechanical and scientific progress and in improved conditions—but there is still a long way to go. Technical progress is of the greatest importance, but in the last resort the future standard and development of agriculture will depend on the qualities of the men and women working in it. It is you, and those working alongside you, who will determine the measure of success, and if you tackle the job as you have done so far I am in no doubt of the ultimate result.

Y. W. W. W.

THEY SERVED THE LAND

A Tribute to the Work of the Women's Land Army, 1939-50

INEZ JENKINS

NOVEMBER, 1950, saw the final disbanding of the Women's Land Army for England and Wales. This end to an eleven-year adventure reawakens old memories, and there are many people for whom it will have special significance—the 200,000 and more girls who for longer or shorter periods have served in the Land Army, the large number of farmers by whom at different times they have been employed, the workers—voluntary and salaried—who have been concerned in the Land Army's administration, not a few officers of the Ministry of Agriculture and Fisheries, the Department which sponsored the scheme, remained responsible for the organization, and for eleven years has kept a fatherly—usually proud and occasionally startled—eye on the large-sized cuckoo which hatched out in the somewhat small-sized nest originally provided. The sister organization in Scotland has a story of its own to tell.

The basic scheme for the Land Army was conceived some two years before the outbreak of war and, generally speaking, was modelled on that of the Land Army of the first World War. The organization actually came into being on June 1, 1939, when a first conference of the newly appointed county officials was held and arrangements were made to start the interviewing and formal enrolment of members, and to send as many as possible for short-term holiday training on farms. It was not until after the actual declaration of war that the employment of land girls began and the Land Army "got going" as an auxiliary war-time labour force. Her Majesty The Queen graciously consented to become Patron of the W.L.A. in 1941.

How often it happens that events belie the forecasts of experts! Before the war, the wise men of agriculture had given it as their firm belief that an England at war would at once need on its farms the services of a substantial number of women. In fact the opposite occurred. War broke out only a month or two before the start of the slack season in farming. There was no sudden expansion of agricultural production, and the war itself did not take the course that had been expected.

The First Few Throughout that first, uneasy period, so unlike war, yet so strangely different from peace, the demand for women's labour on the land was small, and during its first winter the Land Army was embarrassed by a greater number of volunteers than could be absorbed into employment. Immediately upon the declaration of war, the first thousand girls were placed in work. For the most part these were girls who had spent a week or two of their summer holiday in voluntary training and were now recalled to the farms where they had trained. Gradually they were joined by a second thousand and, by the spring of 1940, the employed strength of the Land Army had risen slowly to about 5,000.

These "first few" who worked through that hard winter of 1939-40 laid the foundations of the Land Army's reputation. The majority were employed singly on farms as milkers or general farm workers, a few on market gardens, and a few in charge of poultry, sheep, or pigs. They had come from all spheres—from offices, shops, universities, domestic service, country and city homes. Entering a new life where everything was unfamiliar and difficult, they did not realize perhaps how exceptional were the difficulties of their first winter. Be that as it may, they tackled the problems of frozen

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water supplies, of snowbound roads, of blizzards, sleet and ice, with the same cheerful acceptance and enterprise with which they had encountered their first cow or mastered the ritual of muck-spreading. And, symbolically, in breaking through the ice that sealed watering ponds and drinking troughs, they broke through the ice-crust of prejudice which was proving a real obstacle to the initial placing of women on farms. They won the respect and confidence of the toughest and most dubious of employers, and word went round that the Land Army was "non so bad".

At the start it had been expected that Land Army labour would be utilized for a limited range of work only. Milking—yes; horticulture—yes; both suitable types of work at which girls should do well. It was even thought (though this was a somewhat revolutionary view) a few exceptional women might be able to operate a tractor successfully. But quite soon it became apparent that the girls on the small general farms were turning their hand to most if not all the jobs that were ordinarily done by men, and that quickness and imaginative application often compensated in large measure for lack of physical strength. As early as the spring of 1940, the names of Land Army members were appearing high in the lists of successful ploughing contestants, and it became accepted that land girls could make first-class plough-girls, both with horse and tractor.

On dairy farms, the girls proved all that had been hoped, and more. Former typists, music students, and hairdressers, with their suppleness of wrist and finger, quickly became skilled milkers; most women showed special aptitude for the care of young stock. No praise can be too high for the Land Army milkers of the early days. They accepted uncomplainingly conditions that to them were hard and unfamiliar—early rising in mornings still dark, long hours, rare holidays; they fought and won their battles with homesickness and loneliness, gave themselves completely to their jobs and identified themselves with the interests of their farms.

It was during 1940, too, that the employment of Land Army members in forestry first began. Groups of girls were taken on by the Forestry Commission to work in the nursery plantations, while individual girls whose previous work or education had given them experience in calculation and figures, were trained for responsible posts as timber measurers, assessing the timber felled and prepared by the gangs to which they were attached and checking deliveries in and out of the timber yard. Later, under the Timber Control Branch of the Ministry of Supply, Land Army members were used in almost all branches of timber work, especially in connection with the felling and preparation of pit props. The Timber Corps, distinguished by the wearing of a green beret, was formed as a special branch of the Land Army, reaching in September, 1943, a peak strength of 4,339 employed members.

Full Service The years 1941, 1942 and 1943 saw the big general expansion of the Land Army and a wide extension of its field of work. With the fall of France, the intensification of the submarine blockade, and the swift and steady development of the home food production campaign, there came a real and urgent need for women's service on the land. In 1941 girls were recruited at speed, given a month's introductory training on an approved farm or at a Farm Institute and poured out on to the farms to fill any and every kind of vacancy, to take the place of men who were joining the Forces, and to provide the extra labour needed when old pasture was ploughed out and former grassland areas had to tackle the manifold operations involved in arable farming. By 1942 the various War Agricultural Executive Committees had firmly established their system of gang labour for the cultivation of lands in hand (where the Committees themselves had

THEY SERVED THE LAND

reclaimed derelict land or taken over badly farmed land) or for hire to private farmers to assist in seasonal operations. Again, extensive recruiting had to be undertaken by the Land Army, for very large numbers were needed by the Committees in their gangs. They were used in every type of agricultural operation. Drainage and land reclamation came to be regarded as normal work for girls. There was nothing unusual in the sight of Land Army tractor drivers poised perilously against the skyline where foothills and steep downland were being brought under the plough. And somehow it seemed always to be the most slightly built and youthful looking members who were to be encountered manipulating vast, seemingly unwieldy excavators with an ease as of long practice.

All field operations were now Land Army operations—hedging, ditching, planting, singling, hoeing, ploughing, harrowing, drilling, stacking, harvesting, threshing. It was the county of Kent which first experimented with the large-scale use of Land Army labour in threshing, all the threshing tackle in the county being "zoned," and each set supplied with an operating Land Army gang. Other counties followed suit, and thatching followed threshing. Special gangs of girl thatchers were trained by the War Agricultural Executive Committees and sent about the counties under their own forewomen to thatch the stacks.

Side by side with the Committee field gangs, other Land Army gangs were at work. This form of group employment had been common on market gardens from the outset and had developed substantially. Groups of land girls were now given special training in the pruning and spraying of fruit trees, and pruning gangs and spraying gangs—the latter with their special equipment and odd-looking protective outfits—were to be found efficiently at work in the fruit districts. The Ministry of Supply had its Land Army gangs, too, in the flax fields and stackyards, growing, harvesting and stacking the flax ready for processing in the factories.

Next came pest destruction. Members of the Land Army, trained under the aegis of the Pests Division of the Ministry of Agriculture in the gassing and poisoning of rabbits and rats, were employed by the County Executive Committees. Sometimes they operated in small gangs; sometimes, in twos or threes, they led an odd, independent existence, housed in caravans and moving round from farm to farm within their allotted territory, ridding each in turn of vermin.

Small groups of girls were to be found here and there in charge of grass drying plants. Later, as the use of combine harvesters became more common, girls were employed on grain drying. Other small groups worked in watercress beds or osier beds. One interesting form of Land Army work developed under the Milk Marketing Board, which trained and employed a substantial number of girls as Milk Measurers. These girls, after receiving specialized training, worked singly, paying regular visits to farms within a given area to check the daily yield records kept on the farm and to make their own sample checks of milk yield and butterfat content. Another interesting, though late, development in Land Army work was that of relief milking, where specially skilled milkers were employed by the War Agricultural Executive Committees to relieve the regular workers on the small dairy farms. Each relief was attached to a group of six farms whose owners had indicated their wish to come into the scheme, and on one day a week took over the duties of the regular milker on each farm in the group, so making possible his or her employment on a six, instead of a seven, day week. Some County Committees also employed Land Army gangs of emergency milkers, available to take over at short notice in times of illness or to substitute for regular workers away on their annual holiday. Both in the case

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of relief and of emergency milkers, a particularly careful choice of girl had to be made by the supplying Land Army organization, so that special milking skill and an adaptable personality might ensure her acceptance by farmers—and cows—of varying temperament.

While the system of gang employment of land girls was developing, the Land Army had to provide its own forewomen and forewomen lorry drivers. It was by no means easy to find girls with the necessary qualities of leadership who were also prepared to put themselves forward and to exercise authority over their fellow members. Special intensive training was given, particularly successful courses being held by the co-operating War Agricultural Executive Committees and Land Army authorities in Hertfordshire, Essex and Worcestershire. The object of these courses was not only to give practical instruction in special skills, time-sheet keeping and methods of labour management, but also to present to the potential forewomen a picture of the full year's cycle of field operations, of which the often dull-seeming routine jobs of the gang workers were so essential a part. While it was never easy for the Land Army to produce its own forewomen in sufficient numbers, a large number were produced and did exceedingly well, some going on at the end of the war to fill administrative or semi-administrative posts in agriculture or allied industries.

In August, 1943, the Land Army reached its peak of service; just over 80,000 girls were in employment in England and Wales, covering the full range of agricultural operations. That was more than one-tenth of the total number of workers on farms in the whole country. The very urgent need for women's labour in other fields of essential industry then made it necessary for the Government to restrict, and even for a time suspend, recruitment to the Women's Land Army, so that the enrolled numbers gradually fell to 62,000, which was the total membership when war ended. A scheme of approved release was then introduced, under which members might claim release in order of length of service. At the same time recruitment was reopened and a force was kept in being sufficient to give continuing help on the farms until the return of men from the armed forces, and to assist in the intensive home food production drive which was still needed in a Europe threatened by starvation. This force was held at about 34,000 over the summer of 1946 and did not drop below 30,000 until the end of that year. More than half this peace-time force was employed in the field gangs of the County Agricultural Executive Committees; the remainder were in the employment of farmers. Thereafter, over the past four years, as the need for a supplementary women's labour force diminished, so the size of the Land Army gradually decreased. But the fact that it was possible to maintain a force of no inconsiderable size for more than five years beyond the war is evidence of the vitality of the Land Army. Now, although many privately employed Land Army members will doubtless remain in farm employment for years to come, the special need for a subsidized organization is ended and the Land Army as such has disappeared.

The Land Rewards To claim that general farm work is ideal employment for women would be as absurd as to contend that the Land Army has not had its failures or made its due proportion of mistakes. There are in fact many women for whom land work is too heavy. There are others for whom adaptation to the partial isolation of life and work in the country seems impossible. Many women have applied to join the Land Army who have been mistaken in supposing themselves to be physically and temperamentally suited to this branch of service. Although the organization gradually improved its system of interview and standard of medical

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examination, mistaken enrolments have been made at times and with subsequent unfortunate results. On the whole, however, the eleven-year story of the Land Army is a story of success, of an emergency task many-sided and prolonged, which has been courageously tackled and well performed, a task which could if need arose be similarly tackled and performed again.

Britain owes a debt to its army of girls in green jerseys. But the debt is not all on one side. It is surprising how many town and city dwellers derive (and not so many generations back) from farming stock. In their daughters the appeal for service on the land met a ready response; in many cases it offered a chance to satisfy a longing, perhaps not previously recognized nor admitted, to experience for themselves life in the country. Certainly very many Land Army girls found real happiness in their work, real stimulus in the demands which were made upon their initiative, real reward in the reliance which came to be placed upon them, and discovered moreover a way of life which was deeply satisfying. The Land Girl's debt to the Land Army, and through the Land Army to the country, can scarcely be better expressed than has been done by Hebe Jerrold, a former member of the Timber Corps, whose verse was included in *Poems of the Land Army*, published in 1944:

*War, which has brought to others fear,
Pain, sorrow, slavery and death;
To me has brought what I hold dear
And longed for but could not possess.
Has given me wide stretch of sky,
The sailing clouds, the wind's sharp breath,
A roof of leaves, the wild flower's eye,
Bird song, all woodland loveliness,
Health, vigour, deep content, and faith
That at its source our stream runs clear.
What have I done? I never meant
To be a war-time profiteer!*

Royal Horticultural Society Examinations 1951

General Examination in Horticulture } Wednesday
General Examination for Juniors } March 14, 1951
Closing Date for Entries—Monday, January 15

N.D.H. Examination (written) } Saturday,
(Preliminary and Final) } April 7, 1951
Closing Date for Entries—Thursday, February 1

Teachers' Examination (written) } Saturday,
(Preliminary and Final) } June 30, 1951
Closing Date for Entries—Friday, April 27

ESTATE MANAGEMENT

*A Summary of Three Recent Broadcasts in the B.B.C. Home Service,
by R. R. Ware, M.A., F.R.I.C.S., F.L.A.S.,
Director of the Agricultural Land Service*

THE vast amount of capital invested in the English countryside today has never been accurately estimated, but some idea of what is tied up in the fixed equipment of our farms can be given by the Government's Four Year Investment programme, which provided originally for an expenditure, mainly on re-equipment, of £150 million on the coal industry, £200 million on the iron and steel industry, but £450 million on the agricultural industry.

During the war, public and private enterprise reclaimed from scrub and heath many acres of land which gave us good crops. If we are to keep that land in permanent production it will need further equipment such as farm buildings, water supply and roads. The cost at today's values to replace farm buildings destroyed by fire is, more often than not, greater than the market capital value of the whole farm; and that is not including fences, water pipes, drain pipes and other such pieces of equipment. But fire is a sudden catastrophe. There are more insidious agents at work. Although farm buildings look solid things, they get older every day, and when neglected they are heir to dry rot, damage by gales, underground subsidence, and so on. Even with the most careful treatment they wear out in time unless they are replaced piecemeal. Even our best and most solidly built buildings, such as the great cathedrals, are preserved only by constant watchful maintenance and occasional heavy capital outlay.

Estate management is much more than just carrying out repairs to old buildings. A farm is a commercial enterprise like a factory or a workshop, and it has to be kept efficient and up to date. Farming ideas and methods are always changing, and at no time more than in the last ten years. A wagon hovel will not do to house a combine harvester, but it may be possible to convert it into loose boxes. The old stabling may not be necessary now that tractors are being used, but it may provide accommodation for cows. Sometimes it pays to convert old buildings to new uses; at other times conversion is too costly in terms of inconvenience and maintenance to be worth while, and it is better to build afresh.

One-third of our farmers are their own landlords, and such men have always to be contriving and planning to see that a proper proportion of the profits is put to the maintenance of fixed equipment, so that there is no wastage of capital resources. The farmer who takes his profits at the expense of the fertility of the land is justly condemned, but land can be robbed just as thoroughly by neglecting the fixed equipment of the farm. The game probably lasts a little longer, but sooner or later the bill has to be met. During the war we had of necessity to dip heavily into our capital resources, and the principles of good estate management had to be subordinated to considerations of short-term food production. The Agriculture Act of 1947 provided first for guaranteed prices and markets in order to give stability to the industry, and, secondly, for minimum standards, not only of good husbandry, but also of sound estate management.

The three main objects in estate management are all directed to saving labour, which, incidentally, costs three times as much as it did before the war and is the farmer's heaviest outgoing. First, to save time on the farm; second, to save time on the estate; and third, to save future maintenance. Whether estate staff or outside tradesmen are employed, travelling time is a big item, so that it is necessary to plan work well ahead, collect the jobs

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and have them done together. "I am all for adapting old buildings where you can," said Mr. Ware, "but you must watch the maintenance bills. The other day I saw a completely new set of farm buildings on a farm of 110 acres. They had cost £11,000, that is, £100 an acre. I should have thought that such an expenditure couldn't possibly pay, but the owner had been into the matter very carefully. He reckoned that his saving in tax would reduce the actual capital he had to invest to £50 an acre, and that with the extra rent which the farmer was prepared to pay, and the saving of an expenditure on maintenance which had come to about £50 a year, he would get a return on his money. Old buildings, like old cars, get very costly in maintenance, and modern buildings can be designed so as to need practically none (apart from accidents) for ten years at least."

The Government gives a good deal of encouragement to sound estate management. Direct grant aid is given under certain conditions for water supplies and land drainage, the improvement of hill farms and the building and reconditioning of cottages, and tax is remitted on money ploughed back in estate maintenance and on agricultural improvements. Mr. Ware instanced the provision of a water supply from a private source, costing, say, £2,000. "You can get a 40 per cent direct grant which reduces your capital outlay to £1,200. On that £1,200 you can claim back tax over the next ten years. Supposing the standard rate remains at 9s.—ignoring surtax, which can also be claimed if you pay it—you will get back £54 a year for the next ten years. The value today of an income of £54 a year receivable for the next ten years is £449, so that your actual capital outlay on a water supply costing £2,000 is only £751—not very much more than one-third of the total cost—and you know what a good water supply means to a farm."

The Agricultural Land Service is a service of land agents working for the Ministry of Agriculture. It does the direct land agency work on the estates of the Ministry and those of the Agricultural Land Commission, and for the County Agricultural Executive Committees. We also provide a free advisory service on estate management problems, just as our colleagues of the National Agricultural Advisory Service do on farming problems. There is no cut and dried solution to most estate management problems, and it is here that the Agricultural Land Service may be of real assistance by advising what other people have tried and where perhaps you can see ideas similar to your own already being translated into practice.

Farm Fences The garden-like appearance of the English landscape is due very largely to the hedges and trees which grow in them. England was not always like this. The English hedge as we know it is only about 200 years old. It was during the eighteenth century that English farming began to take on its present pattern and the old open common fields were enclosed with hedges. Then for the first time it became possible to mix livestock and arable husbandry and so build up the fertility of the land. The older hedges were mostly of holly, nut, elder and maple, and followed a winding course along a lane or stream or other natural boundary. The new enclosure hedges were almost invariably of quickthorn and their course, except where they followed an old boundary, was straight from point to point. Quickthorn is still probably the best for a live hedge, though in parts of Somerset, beech hedges set on stone banks are popular, and in other places one finds hedges of holly, hornbeam, gorse, hazel, blackthorn and even sometimes of spruce, to say nothing of hedges of mixed plants, with the intrusive elder crowding out more valuable species. There are also the dry stone walls of Wales and the North—in country too exposed for hedges

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and where the stone was ready to hand—the same operation cleared the stone from the surface of the land, so making more grazing.

The planting of hedges was usually accompanied by land drainage, so that the method of planting the new hedges was to open a ditch and plant a hedge on the bank of soil thrown out. As it is supposed that the man who made the hedge dug the ditch along his boundary, it is usually presumed, if there is no evidence to the contrary, that the boundary follows the open edge of the ditch, and that hedge and ditch are the property of the owner of the ditch-free side. But ordnance maps show boundaries to the middle of hedges—a point which is worth remembering when land is bought or sold.

A quick hedge, properly looked after, has an almost indefinite life, and although it may become slightly gappy in the bottom, it does so gradually; whereas a wire fence near the end of its life can be dangerous as well as an eyesore.

Contrasting quick and wire fences, Mr. Ware said that a wire fence represents capital depreciating year by year, but a quick fence can be maintained by the farmer himself, and the work of maintenance can be fitted in with the other work of the farm. A quick fence too is a kindly thing, giving shelter to stock and nesting birds. A good deal must depend, of course, on the kind of farm, but in exposed areas at any rate shelter and shade for stock are worth a good deal to the farmer, and on light land it may save his sugar beet or carrot seedlings from being blown away in a dry spring. Neither should it be overlooked that hedgerow timber in the right place is a very useful reserve of hardwoods, and may put a few pounds into the bank to help with estate repairs. The old hedgers always used to leave a straight young sapling or two to grow up into timber, a practice that ought not to be allowed to die.

Many of the old enclosures were too small for modern conditions, and today we need fields to be of reasonable shape and size. But the re-planning of fields needs great care. The ideal size will depend on the size of the farm. In hilly country perhaps more attention should be paid to contours, so as to put our permanent hedges where they can give most shelter and exploit their benefit for ploughing. Grazing fields are usually better rather smaller than for arable purposes. But a 20-acre field can always be divided by a temporary fence when in grass. Two things to be remembered in replanning fields are water supply and road access. A field is not of much use if its crop has to be carried across another growing crop, and its use in the rotation is restricted if it has no water supply. When the permanent fences have been decided upon, keep them well and bulldoze out the rest.

Of dead fences, the cheapest and simplest to erect is probably the wire fence. Galvanized wire rusts rather quickly if exposed to sea air or to smoke fumes, but under ordinary conditions galvanized wire will have a life of about twenty years. The strength of a wire fence depends primarily on the straining posts and the tautness with which the wire can be strained. Straining posts should, therefore, be set 4 feet in the ground, well rammed and held with a strut against the direction of strain and with an underground "anchor". Straining posts should, incidentally, always be fixed at the point of any change in direction or marked change in gradient. Otherwise, if the fence is straight, it is easier to get the wire taut if the straining posts are well apart—say, 150 yards on level ground. Intermediate posts are best driven rather than dug in, since the driving consolidates the soil and gives the post a firm hold. A mechanical post driver can be used which will drive even concrete posts, or there is a mechanical post hole-borer which is tractor driven and makes quick work of a long fence. In this country we tend to put our posts closer together than they do, for example, in New

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Zealand. The standard recommendation in this country is 3-4 yards apart, but in New Zealand they reckon 3 posts to the chain (that is $7\frac{1}{2}$ yards apart). Quite a good plan is to substitute for alternate posts, or even for two posts out of three, intermediate droppers, that is, vertical bars of wood or metal which stiffen the wires and keep them the right distance apart, but which stop short above ground level. If the fence is tightly strained it will be just as stock-proof, although possibly not so strong as to withstand the weight of people who climb over or scramble through it—but that is bad for wire fences anyway; a stile is the answer. The number and spacing of the wires depends entirely on the kind of stock being fenced against. It is usually a good plan to have the top wire barbed and one other in the middle to discourage stock from reaching through.

Pig wire or woven wire fencing is also popular, although it is more expensive than a strained wire fence and cannot be made so taut. There are different sizes for different classes of stock, and it is important to use a size through which they cannot push their heads.

The major questions with other kinds of fencing, whether permanent or temporary, are how long it will be required to stand, and what kind of stock is it to be used against. Materials ready to hand should always be considered first: oak, Spanish chestnut, larch and yew from a small plantation or spinney will provide good posts, as also will cypress and thuja. Oak, larch and chestnut are improved by creosoting. Most posts tend to rot in time where they enter the ground, but almost any kind of timber can be used for posts if the butts are impregnated with creosote to a point above ground level; surface creosoting is useless, since to give protection creosote must be forced into the cells of the wood. This is usually done on a large scale by a pressure creosoting plant or a hot steeping tank. On a small scale an effective job can be made by standing the posts in an old oil drum or similar receptacle raised on a hearth made of old bricks. The drum is filled with creosote to within about 8 inches of the top, and a fire of brush or waste wood lighted underneath and the creosote heated to just below boiling point. The fire is then drawn and the creosote with the posts still in it left to cool. The heating process expels the sap and moisture from the cells of the wood, which suck in the creosote as they cool. A cubic foot of wood will suck in as much as a gallon of creosote in this way.

Split ash poles or larch thinnings sawn in half make good rails. Where wood, such as ash or chestnut, splits easily, it is always better to split it than saw it. When wood is split a natural line of cleavage is followed and the fibres are not damaged, as they are by sawing. Cleft oak gates are not often seen nowadays, but they were lighter than sawn gates and very long lasting. Gates are better preserved by impregnating them with creosote than by paint. Painted gates may look nicer but they rot quicker at the joints. Oak gates should be left untreated. Money should not be wasted on gates which are opened only a few times a year; slip rails are cheaper and less likely to get damaged, and they don't take very long to fix and unfix. Lastly, see that the gates are wide enough for the implements to be taken through them. Big implements will need double leaf gates. Coaxing an implement through a gate which is just not wide enough is bad for the implement, the gate and the temper.

Farm Buildings Most of our farm buildings are relics of the Golden Age of British farming. It does a land agent's heart good to see how boldly they laid out their money in the first half of the nineteenth century. Farmers must have faced then the kind of problem we are facing now: where to adapt and convert and where to rebuild.

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As already stated the three principal objectives of estate management are: saving labour on the farm, using estate labour to the best advantage, and cutting down charges on maintenance. "I'm all for making the best use of what we have," said Mr. Ware, "but in planning farm buildings you've got to be bold—no tinkering!" Some of our farm buildings really are an extraordinary conglomerate of bits and pieces, difficult to work in and expensive to maintain.

I went over an estate only a few days ago which had been very well maintained in the years between the wars. A good many new buildings were built then, but new work had been done with an eye to economy. Three walls had never been built where two would do, and every outside wall was covered with lean-to structures, usually with roofs of much too flat a pitch. One wandered about in a labyrinth of small dark yards more like a gipsy encampment than a farm. Most of the structures were of wood and tin, and as they are now about three-quarters way through their natural life, the annual bill for estate repairs is absorbing most of the rents. None the less, in spite of the lavish expenditure on patching and painting, the end is already in sight.

Attention to farm buildings is not just desirable; it is essential. Good business is usually good sense and leads to good estate management. From a business point of view, farm buildings are as so much capital which is steadily depreciating and against which, in theory at any rate, you must set aside an annual sum. Depreciation can be assisted by careful maintenance, but there comes a time when expenditure on maintenance gets very high and the effect of that maintenance in slowing down depreciation gets very low. At that stage fresh capital may be the only economic answer. There are two other factors to be taken into account. By spending the new capital it should be possible to effect some improvement in the organization of the farm. This will result in a saving of costs in production and will in turn be reflected in increased rent. Also there is the important consideration that you are not called on to make the whole of the capital expenditure yourself. Forty per cent at least of the new capital required comes out of the public purse—considerably more in the case of a surtax payer or in the case of certain works which receive direct grant aid.

"It often seems to me," continued Mr. Ware, "that in our thinking on estate management we put too much stress on the direct return which we can get on capital, important as it is, and not enough on the indirect return which we can get from improving the maintenance-depreciation ratio. The sort of sum which you have to do is this. Supposing a new building is going to cost you £2,000—it will in fact cost you a bit more than that if you make provision for depreciation because it has a life of say only 60 years. The money you would have to invest to write it off would be £340. So that your £2,000 building really costs £2,340. Now tax relief will take care of £900 of this, so you really have to find only £1,540. If you require 5 per cent on your outlay, you will have to look for a return of £77. This sets you back a bit if you can only see your way to getting £40 a year on the new building in increased profits. All well and good, but now look at it this way. Your present old and inadequate building is costing you £30 or £40 a year to repair and it has a limited life, whereas the new building may not cost more than £5 a year in repairs on average over the full 60-year period. What is more, you have to remember that the old building will not last for ever and may now have a maximum life of, say, 15 years. You will have to make some provision for replacing it by then, so that its true depreciation rate is pretty high. Looked at this way, your new capital expenditure may be justified.

"I know these figures sound rather confusing, but work it out for yourself, remembering that you've either got to go on repairing the present building indefinitely if you can and the cost won't grow less with the years, or that you'll have to replace it sooner or later."

When a new building has been put up, there should be no hesitation in scrapping the old, unless it can be converted into something that will at least

earn its keep. An integral part of the plan for new buildings is the elimination as far as possible of continuing maintenance charges, especially painting, which is very expensive and effective only where it is really well done. The alternatives are timber creosoted under pressure, and the use of asbestos and concrete. With modern materials it is possible to design buildings that will need no painting at all.

The idea of having farm buildings constructed of light materials which can be scrapped after a year or two and built afresh is quite good, but it never seems to work out well in practice. Light buildings do not stand up to the hard knocks they inevitably get on a farm, and anyway, fifteen or twenty years go by very quickly, and it is better to make a solid job and have done with it than to be for ever tinkering.

Wherever possible, buildings should be constructed simply and made adaptable for internal rearrangement. It is surprising what can be done with four good walls and a roof, provided there is space, good light and ventilation. Farming methods change, and specialist building may turn out to be an incubus. The future tendency is likely to be towards greater simplicity in design, with buildings gathered as far as possible under a single roof, so that all the farm operations can go on under cover.

Pay great attention to detail: doors which stick or ventilators that jam are irritating, and will inevitably get broken and have to be replaced. Everything on a farm should be strong and fool-proof. A farm is not the right place for delicate or fancy pieces of equipment. "I hope," continued Mr. Ware, "that the future may give us more standard products—window frames and door frames and other fittings of standard size which can be ordered by post or telephone, knowing that they will fit into the standard size openings."

Some useful new building materials are coming forward: pre-stressed concrete, for example, which is reinforced by wires in tension and has the quality of flexibility. It should be ideal for roof trusses and other components, since it will not rot and will need no painting or attention.

True, some building materials are rationed and others hard to get, and a licence is necessary to spend over £500, but it is for that reason that we should not waste resources on trumpery buildings and patching and painting.

IODINATED PROTEIN AND LACTATION

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TEN years ago, two chemists working in the I.G. Farben laboratories in Germany announced that they had been able to synthesize the hormone of the thyroid gland by a relatively simple process of "iodinating" the pure protein, casein, under carefully controlled conditions (1). Since then comparable materials have been made in many countries and hundreds of experiments involving several thousand dairy cows have been carried out, in which it has been shown conclusively that this source of the thyroid hormone will increase milk yields. More recently work in Britain has shown that it is possible to make the thyroid hormone more directly so that the pure substance can be given in concentrated form rather than as a protein

*In receipt of a Senior Award of the Agricultural Research Council.

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containing at the most 3 to 4 per cent of the active ingredient (^{3, 2}). Some of the experiments have been carried out, not on experimental farms or in laboratories, but under severely practical conditions with what appear to be excellent results (^{4, 5}) but, nevertheless, a recent review by a committee of British, American and Canadian workers (⁶) emphasizes that these thyroid-active materials are still in the experimental stage and their widespread use is at the present time not desirable.

Response to Iodinated Casein The increase in milk yield and in the fat percentage of the milk which occurs when iodinated casein is fed to cows depends on a number of factors. First, there is almost a direct proportion between the amount fed and the yield increase. Half an ounce given daily will increase milk yield by about 15 per cent, and a daily dose of $1\frac{1}{2}$ oz. by up to 40 per cent (⁷). Higher doses have resulted in even more spectacular increases in yield—over 50 per cent (⁴). Secondly, the smaller the cow the greater is the response to a standard daily dose, and thirdly, the older the cow the greater is increase in yield (^{7, 8}). Thus in experiments carried out in England and Wales in 1944 (⁴) the mean increase in daily yield of 174 heifers was 20.5 per cent, of 217 young cows two or three times calved 22.7 per cent and of 102 old cows calved more than three times 25.0 per cent. The most important factors which influence the response are those which are concerned with the productivity and stage of lactation of the cow (^{7, 8, 9, 10}). At the peak of lactation the response is negligible, whereas in late lactation the response is high. A poor cow giving only 2 gallons of milk per day when having been in milk only ten weeks will give an extra 3.9 lb. when fed $\frac{3}{4}$ ounce iodinated protein daily. A good cow yielding 2 gallons when she has been in milk for thirty weeks will give an additional yield of 7.8 lb., that is, twice as much as the poor cow. A really high yielding cow, about 8 or 9 years old, maintaining a yield of 3 gallons when she has been in milk for seven or eight months, can be expected to give an extra gallon of milk every day from the same amount of iodinated casein which in a poor yielding heifer two months calved would perhaps result in a quarter of this amount. One other point of fundamental importance, is that if disease, poor management, or poor feeding is already limiting the milk yield of the cow, then her response will be small. Comparing cows of the same age, the same breed and at the same stage of lactation, it has been proved beyond doubt that if disease control, management and feeding are poor, then the response will be less than half what could be attained under good conditions.

These large increases in milk production, however, are not the only effects of iodinated protein feeding. The thyroid hormone increases very markedly the physiological function of the animal; in fact, she becomes comparable to a human being affected by the serious disorder of metabolism, "Graves disease". When only small quantities are given the symptoms are mild, but at doses sufficient to result in an increase in yield of only 20 per cent they are already quite serious. The pulse rate of the cow increases from the normal of 60-70 to over 90 per minute, her body temperature rises very slightly (by about 0.1° to 0.2° F), her rate of breathing is quickened by about 50 per cent, this increase being greater in warm weather, and she loses weight. If no extra food is given to the cow well over a cwt. of body weight can be lost in as short a period as seven weeks of continuous treatment. Experiments have shown that a serious drain of body protein and, more important perhaps, body calcium and body phosphorus occurs during treatment (^{11, 12, 13}). This loss of calcium is so large that X-ray photographs of the treated cows show the bones to be highly porous; in young animals the gait

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and posture become similar to those seen in cattle suffering from rickets⁽¹⁴⁾. If treatment is continued without additional food being given, a decline in the response occurs⁽¹⁵⁾. Extra food can prevent a large part of the loss in weight, but the cow's increased rate of function continues, and she shows all the signs of this increase unabated. In general, it appears that a 20 per cent increase in the cow's milk yield entails an increase in her maintenance requirement of 20 per cent, and this must be met by extra food, together with an increased production ration to cover the additional milk yield^(16, 17, 18). Other symptoms also occur. The cow becomes more irritable and nervous, she tends to scour and to salivate a little; and in some cows the eyes have a characteristic stare, with a slower rate of blinking than is usual. The cows feel the effect of hot summer days far more, and because of the great increase in their heat production, have difficulty in keeping cool.

Little is known of the effect of iodinated protein feeding on length of life. It appears to have little effect on the incidence of the major diseases of cattle, but observations have been made which suggest heart damage in cows and in experimental goats^(4, 11). Similarly, sterility has been studied very little, although there are reports that long-continued stimulation up to 3½ years does have an adverse effect⁽¹⁹⁾. Dyrendahl in Sweden⁽¹⁴⁾ in fact states that after 3½ years "several of the iodinated casein treated animals show a clinical status, even after their first lactation that raises the question whether the lifetime of these animals will not become shorter than normal." No deaths of cattle due to iodinated protein feeding have yet been reported, but sheep have been killed with iodinated casein. The amounts necessary to cause death in sheep are equivalent to 2½ to 3 times the amounts recommended for cows, the equivalence of dosage being based both on body size and on the increases in metabolism which occur⁽²⁰⁾. These deaths in sheep were due to the failure of the heart and circulatory system to keep pace with the enormously stimulated metabolism of the cells of the body, and it will be noted that the safety margin is not large.

Great Risks Involved Despite our lack of information on some aspects of iodinated protein stimulation, sufficient information is already available to allow an appraisal of its practical use on farms. Many have heralded iodinated proteins and thyroxine as a panacea for all those cows which do not give high yields. The increase in total milk yield of 10,000 gallons from 500 cows treated for a six-week period in 1944, might be regarded as a valid reason for its use on a wide scale. Others, quoting the same experiments, have already condemned iodinated proteins because the increases in yield which are possible could cause some concern in milking trials at dairy cattle shows or in the interpretation of milk records for breeding purposes. In order to make a true appraisal, all aspects must be considered, but the main ones are whether or not this method of increasing milk yields is safe for the milk-drinking public, whether it gives an economic return to the dairyman in the light of the cost of additional food, and lastly whether it is a suitable method to use on farms for increasing milk output, bearing in mind its relation to established practice and to established methods of herd improvement.

The milk produced by cows given iodinated protein or other sources of thyroid hormone does not contain the hormone⁽²¹⁾. It has a higher fat content, a slightly higher solids-not-fat content⁽⁸⁾, while the vitamin content is not affected to any appreciable extent⁽²²⁾. It is thus both safe and nutritionally adequate, despite the small decline in vitamin C content⁽²³⁾. Under conditions where maximum responses are obtained—that is, where selected

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cows are given the material for about two months in late winter before going out to grass in the spring—the process is economic, the additional food cost not being sufficient to offset the gross profit. Where only the older cows are given the material for relatively short periods, and where the dosage is carefully controlled, the possibilities of untoward long-term effects can probably be avoided, although this is by no means certain.

Whether this method is a safe one to use in commercial practice is open to considerable doubt. First, it is certain that on many holdings milk production could be increased by the control of disease, by better feeding and better management of the cows, far more than it ever could by feeding iodinated protein. On such farms it has already been noted that responses to iodinated protein are in any case small, and it is doubtful whether sufficient individual attention is given to the cows to enable a selection of suitable animals to be made. Even on the remaining farms—and better farms—it is doubtful whether the risks involved are worth while. On the majority of these farms the feeding of the cows is in the cowman's hands, not the herd owner's. Overdosage of the cow may occur through accident, misunderstanding or intent, and overfeeding with a thyroid active drug is not in any way comparable to overfeeding with dairy nuts or even overdosage with sulphonamide drugs. The symptoms of hyperthyroidism are not always recognized, especially by a farmer whose cow is yielding an extra gallon of milk a day, and, as has been pointed out, the margin of safety between a correct dose and a dose sufficient to cause grave concern is small.

Iodinated protein and synthetic thyroid hormone are not yet available in this country for use on anything except an experimental scale. Although it is possible to increase milk production by feeding thyroid-active materials, it is doubtful if the process is one to be recommended to the farming community at the present time, because the risks involved are too great. There is not yet sufficient information available regarding its effect on life-time productivity to make any recommendation as to its use on anything but a very limited scale, and in any case the number of farms on which these materials could make a contribution to total milk output is small.

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MORE SHEEP AND CATTLE ON A CAERNARVONSHIRE FARM

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IT often happens in North Wales that farm tenancies remain in the same family for generations. If there are two sons in a family it is usual for the younger to take over the father's tenancy, and the elder is found a farm elsewhere. It so happened in my father's case, when his younger brother was left to take on the tenancy of the old home in South Caernarvonshire, where the family is known to have farmed for over three hundred years, and he was given the tenancy of this farm on the same estate in 1882. I took over the management in 1928, farming on the same lines and to the same pattern my father had set when he acquired two additions to the 200 acres he had, just after the end of the 1914-18 war. The first addition was 150 acres of adjoining land with open sheds and old buildings attached, the other a mountain farm of 1,000 acres of rough land on the slopes of Snowdon, about seven miles away. Both of these fitted in very well with his conception of a sound commercial enterprise; the first because it lay between two portions of his former holding and could be run without any additional labour, and second because it supplied a regular flow of Welsh mountain ewes for crossing with Southdown rams to supply the high-class small jointed lambs that were in such fashionable demand at that time.

From 1923 until the early 'thirties, the main feature of the farming was fat lamb production, with beef production a good second, and a small retail milk round in a nearby village of 20 gallons a day in winter and 35-40 gallons a day in summer. About 400 cross-bred lambs from an equal number of Welsh ewes would be sold during June and July. In August between 200 and 250 wether lambs from the hills would be weaned and fattened on the aftermath and perhaps a little rape. For the beef market two-year-old Welsh steers would be bought in early spring, cake-fed on grass and sold fat during the summer. Any left over after September, plus further purchasing of strong stores to make up the number to about forty, would be fed in the yards and finished off for the Christmas sales. No cattle would be fed after December, and soon after the yards would be racked out and the manure spread on the grassland.

About 8 to 12 acres of grass would be ploughed up each year and all put under swedes, with the exception of 2 or 3 acres for mangolds. It would then be seeded down with ryegrass, Vale of Clwyd clover and wild

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white clover under a crop of oats the following year. The maximum acreage under the plough for one year would be 24. Liberal dressings of the highest grade of basic slag obtainable would be applied to the grassland.

Looking back over these years immediately after the 1914-18 war up to about 1928, I feel that this was a very comfortable way of farming, which at the same time showed a fair production from the 350 odd acres, and I am not sure, even now, whether this is not the best use we can make of the grass that we can grow so easily in the west. Close on 1,000 fat sheep and lambs would be sold each year, together with a 100 to 130 fat cattle. In addition, a fair quantity of milk would be sold each year and a few fat pigs produced. With three regular workers, and an occasional fourth, the farms were kept reasonably tidy. Weeds were kept under control and the hedges were regularly trimmed, these two items occupying most of the men's time during the periods they were not occupied with the harvests and looking after the stock.

Swing towards Milk About 1929, foot rot in sheep became rather a problem, and later on, in the early 'thirties, intestinal worms in lambs took a heavy toll. As time went on, the lambs were not doing nearly so well, and prices of fat sheep and beef were dropping year after year. It soon became apparent that changes would have to be made in order to keep the farm's economies on an even keel. A year before the Milk Marketing Board came into operation I decided to turn my attention more to milk production and to consolidate my retail round. The cowhouse was modernized, the cattle were tested, and tuberculin tested milk was produced. The number of sheep was reduced, and the milking cows increased. This, however, did not necessitate any radical change in the farming system, and right up to 1939 very little more land than previously was put under the plough. More land, however, was kept for hay. It was during the war years that the real changes came about. Instead of 20 odd acres under tillage crops, the figure became 120, and at one period the sheep were entirely dispensed with in order to provide fodder and grazing for treble the number of milking cows. The fat cattle numbers had to be reduced and replaced by young dairy stock for replacement to the milking herd, which had become attested a few years previously. About this time the grading up of the Dairy Shorthorn cattle was started.

The blow of having to give up sheep on the lowlands was softened to some extent by the fact that it was possible to increase their numbers on the mountain. In two or three years the flock of 500 breeding ewes was increased to about 750. This was made possible by bringing most of the shearlings and some of the weaker ewes down about the middle of February, and lambing them down. As the low-lying portion of the mountain was improved by cattle grazing, ditching and so on, the number that had to be brought down to the lowland was reduced each year. As the new leys began to come along and increase, it was possible to winter most of the ewe lambs at home. Outwintering sheep had become an expensive item, and being able to keep them at home was some compensation for the loss in the returns on fat lambs.

Winter milk production was now the main purpose of farming, and in 1942 I was able to buy the lowland farms, so there was little difficulty in adapting the buildings for this purpose. The stables and two small sheds were converted into shippens, and electric power installed; and the cropping system also began to be planned mainly for winter feeding of dairy cattle. No strict rotational cropping was adopted, the main crops being oats, kale, mangolds and latterly a cereal-legume crop as a supplement to the grass silage. Beans and linseed were given a fair chance, but without very much success. The land is of a light gravelly nature, and no more than two

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successive white crops could be taken off at any time, even during the most exacting period of the war. A certain amount of summer beef was produced on about 80 acres of old pasture and meadow land. More than half the store cattle were now bought in the autumn and were wintered out, coming in for straw in the open sheds at night, and their numbers made up by further purchases in the spring. It should be made clear here that the buying in of non-tested store cattle from outside is made possible by the fact that the two lowland farms are divided by a road with stone walls and a quickthorn fence as a boundary. The milking and the attested cattle are kept on the original farm, Bryn, and the fattening cattle are kept in the adjoining farm, Crug.

New Leys carry More Stock At this period, only the Shorthorn heifer calves were reared, and the entire beef output was from purchased animals. As time went on, however, the direct reseeded of parts of the old pasture and the drier parts of the meadows, increased the stock-carrying capacity of Crug. September and October beef from stores bought in March did not leave a big margin, and for the last four or five years all calves have been reared. A qualified Dairy Shorthorn bull, purchased in 1945, has produced suitable calves for the beef market and good milking daughters. Last year 80 acres of land were ploughed and the crops were as follows: 8 acres potatoes, 9 acres kale, 9 acres oats and vetches for silage, 6 acres mangolds, 8 acres direct reseeded, and 40 acres oats. In addition to the cereal-legume silage, grass silage from about 20 acres was also made. The milking cows were folded with the aid of an electric fence on the kale up to the end of February or early March and gradually switched on to cereal-legume silage and mangolds, followed by grass silage. The mangolds and half the silage are fed outside. Hay, oats and such concentrates as coupons will allow made up the remainder of the ration. The average yield per cow last year in a herd of 44 was 769 gallons.

Also about the same time four years ago it was found that the new leys could carry more sheep, and another change was made in the sheep management. The Welsh mountain ewe lambs were again wintered away and instead 120 of the four-year-old draft ewes were retained at Bryn for crossing with Border Leicester rams. The ewes with ewe lambs were sent up to the mountain and the ewes with wether lambs were kept down for fattening. The first year about 50 half-bred ewe lambs were obtained and tupped with a Suffolk ram and now form the oldest of a flock of about 150 half-bred ewes, which it is hoped can be increased to 200 by introducing 50 half-bred ewe lambs each year from the mountain. As an experiment, and in order to find out the heaviest type of cross-bred lamb, Hampshire Down and Wiltshire rams have been introduced to the flock of half-bred ewes last autumn. Whilst the average dead weight of a Welsh mountain lamb is about 31 lb. an average of 49 lb. was obtained from the Welsh Mountain-Border Leicester wether lambs, and twins from the Suffolk cross with the half-bred ewe killed out at 52 lb. Furthermore, an attempt has been made successfully to produce mutton direct from the mountain by keeping wethers up to four years old, and now I retain about 50 wether lambs each year for this purpose. Usually, the mountain is overstocked with ewes in winter and understocked in summer. By retaining matured wethers which keep to the top of the mountain, a balance is kept. An important economic problem faces mountain sheep breeders at the moment, in that the demand for the small mountain ewe appears to be diminishing among lowland farmers. I am attempting, with my present sheep management, to try and overcome this by providing the lowland farmer with a good type half-bred ewe, by trying to improve the

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Welsh mountain ewe by reducing the number of the flock from 750 to 600, and by more drastic culling of the ewes and better selection of rams. The enthusiasm of a large number of hill sheep farmers in Caernarvonshire has resulted in the formation of a Society for this purpose.

Full Economic Development of Mountain Land

With the possibility of improving hill grazing by the introduction of surface dressing from the air, the improvement of the Welsh sheep on the hills, the potential qualities of the half-bred ewe, and the possibility of rearing more beef cattle on the improved hill land, I am convinced that the combination of the hill and lowland farming will once again come into its own, and on these types of farms that are so numerous in many parts of North Wales, the order may once again be reversed to sheep, beef and milk. One thing I am certain of, and that is that before we can fully utilize the type of mountain land we have in Caernarvonshire and elsewhere in North Wales, it will have to be farmed in conjunction with a lowland farm. On this type of mountain land improvements are limited, and in the main costly, and unless a farmer who farms such land has also other land lower down, the full economic resources of the mountain land cannot be developed solely by grazing with mountain sheep and the production of store lambs.

SEED POTATO PRODUCTION IN WALES

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ALTHOUGH Wales is a pastoral country, seed production has been an integral part of the farming of some areas for many generations, and certain localities have a tradition of growing good seed of farm crops. Parts of Cardiganshire and Pembrokeshire were famous for their barley seed, Anglesey for its barley and oats, and the Vale of Glamorgan for its wheat. Similarly, the Vales of Clwyd and Glamorgan, and parts of Montgomeryshire had a tradition for red clover seed. On many farms in these localities the sale of seed was an important item in the farm income. There seems, however, to be little or no record of seed potato production forming part of the farming system in any area, although there are many known instances where the same stock of potatoes was kept on the farm for many years. Seed potato production is of recent development, and its origin can be traced to a survey of the potato crops on a number of farms in North Wales carried out in 1921 by T. Whitehead and C. L. Walton, the Advisory Plant Pathologist and Entomologist, respectively, at the University College of North Wales.

Initial Developments Potatoes were found to be grown over the whole area, although usually on only 1- or 2-acre plots, and yields varied from 5 to 14 tons per acre. In addition to lack of manuring and suitable cultivation, Leaf Roll was an important factor in the incidence of

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low yields. The evidence accumulated during this preliminary survey suggested that a correlation existed between an absence of potato aphids and the maintenance of vigour in crops grown from home-saved seed; this correlation was confirmed in later work. There were exposed windswept areas—mostly coastal—with few or no greenfly, where potato stocks which had been grown without change of seed from seven to (so it was claimed) seventy years still showed not more than 5 per cent visible virus infection. Yield trials with ten-year old stocks of Kerr's Pink and fourteen-year-old Great Scot gave yields at least as high as those of the best seed obtainable from the north of Scotland.

The investigators considered it reasonable to assume that conditions in parts of the area surveyed were unfavourable for the development of virus diseases, and that healthy stocks of potatoes could probably be produced in them. The first attempt to grow seed commercially was made in 1927 on four farms, using Banffshire seed of four varieties, but in the following year a grant was obtained from the Ministry of Agriculture; fifteen farms were provided with Irish seed, and Mr. J. F. Currie was engaged as Supervisor of the Scheme.

During the early years of the project a number of investigations were carried out. The spread of virus diseases if any was noted each year, and later Dr. Maldwyn Davies made a detailed examination of the incidence of aphids in these areas. In addition, the yields of stocks grown on the same Welsh farms for a few years were compared with those of high quality Scotch seed⁽¹⁾. The Welsh seed gave results equally as good as the Scotch. The plots were kept under observation during the growing seasons, but rarely could any difference in health, vigour or foliage be discerned.

The work of inspection was carried out under the auspices of the University College of North Wales and eventually, in 1933, a co-operative society, the North Wales Seed Potato Growers Ltd., was registered to encourage the production and marketing of certified seed potatoes. Membership of the Society increased from 23 in 1933 to 78 in 1939, and the acreage covered from 17 to 116.

The next development in seed potato production occurred in North Pembrokeshire. Here, as in many other areas of England and Wales, the depressed conditions in the agricultural industry in the early 'thirties were being felt generally and it was imperative that farmers should investigate every possibility of new methods of increasing their farming incomes.

A new industry of early potato production was organized during the middle 'thirties, but many difficulties had to be overcome, among them the question of obtaining suitable seed and its delivery early enough to ensure efficient chitting. At that time Sharpe's Express was the variety mainly grown, and Scotland was the most popular source of sound seed. Both variety and source had their disadvantages. The variety was susceptible to Wart Disease, and the crop grown from it could not—by the Wart Disease Order, 1923—be sold in any market situated in a "clean" area. This meant that ware markets such as London and Bristol were closed to this variety. Moreover, it was extremely difficult at that time to get Scotch seed merchants to deliver seed before Christmas.

As a result, a detailed survey of the Preseli district of North Pembrokeshire was made by D. Walters Davies, Advisory Mycologist, and J. R. W. Jenkins, Advisory Entomologist of the Agricultural Department of the University College of Wales. The survey showed the incidence of greenfly to be extremely low, and the area was considered suitable for seed potato production. A scheme was therefore formulated in January, 1936, under which farmers around the village of Crymmych, situated 500 feet or more

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above sea level, were invited to grow seed potatoes. It was decided to grow the then new early immune variety Arran Pilot. Scotch seed was purchased and distributed to twenty-one members.

From 1937 to 1939 the number of growers under this scheme increased from 21 to 31. No special effort was made to enrol new members at this period as the suitability of the Crymmych district had to be established.

War-time Expansion After the outbreak of World War II it was soon apparent that Welsh farmers would have to increase not only the tillage area, but also the acreage of potatoes on their farms.

Table 1. Acreage of Potatoes Grown in Wales

	1939	1944	1949
First Earlies	2,795	11,153	16,228
Maincrop and Second Earlies	13,876	55,934	42,241
Total Potato Acreage	16,671	67,087	58,469

Proportionately, there has been a much greater increase in the acreage of first early potatoes than in that of second earlies and maincrop. In Pembrokeshire the early potato acreage has risen from 1,108 in 1939 to 7,466 in 1949, the area having been reasonably stable since 1947.

During the early years of the war supplies of seed potatoes became unreliable in every respect. The quality became poorer, the incidence of disease was higher, and dislocation of long-distance rail traffic delayed deliveries. A few of the War Agricultural Executive Committees began to tackle the problem on their "lands in hand". Some took over large tracts of bracken land in upland areas. After ploughing in midsummer, a pioneer crop of rape and turnips was grown; this was usually grazed off by sheep and the land planted with seed potatoes.

In this way very successful seed crops were grown. It was only natural, therefore, that some of the keener farmers saw the possibility of a profitable enterprise in this new crop. As a result, two new seed potato-growing societies, fostered by the agricultural co-operative movement, came into being. The Powysland Seed Growers' Association was formed in Montgomeryshire in 1942, and Brecon-Radnor Seeds Ltd., embodying farmers in these two counties, in 1943. During this time the seed growers' associations began to co-ordinate their activities, and the Welsh Seed Growers' Federation came into being. As a result it was possible for one of the organizers of the Welsh Agricultural Organization Society, Ltd., to devote practically the whole of his time to the services of the Societies, either individually or through the Federation. Since then two new associations have been formed, the Denbigh and Flint and the South Cardiganshire Seed Potato Growers' Associations both in 1949.

Selection of Varieties During the early days of the North Wales Seed Potato Growers' Association, members concentrated mainly on maincrop varieties, whilst the growers in the Crymmych areas catered specifically for the South Pembrokeshire market. With the formation of new societies, it was necessary to decide for which market it was intended to cater, and ultimately what varieties to grow. During the early war years, it was difficult to visualize the role of ware potato production in Welsh farming, but at the same time it seemed reasonable to assume that the early potato industry in South Pembrokeshire and some other South Wales coastal areas

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had come to stay. On the other hand, there was a ready market for maincrop, as well as for early varieties in the border counties of Cheshire, Shropshire and Herefordshire.

The Mid and West Wales Societies have concentrated primarily on the production of early varieties, and this policy certainly appealed to the farmer-growers. Growers in these areas offered certain advantages to the early potato growers in Pembrokeshire. Their relative positions made farm-to-farm delivery by lorry practicable, with a consequent reduced risk of damage by frost or by handling in transit. Their proximity has enabled Welsh seed to reach the early growers at a much cheaper rate than that from Scotland or Ireland. Delivery in good time for earlier chitting can also be ensured. From the seed growers' point of view, the disposal of the seed in the autumn is of considerable practical importance, as it obviates the difficulties and risks of winter storage. Buildings for storage are almost non-existent, and clamping is hazardous on upland farms.

The Societies in North Wales however, though growing earlies, are also growing maincrop varieties to meet a local demand and the requirements of the border counties.

Of the early varieties grown, Arran Pilot is the most popular, although during 1948 and 1949 there was a market increase in the acreage of Home Guard. Of the maincrop potatoes, the most popular varieties are Majestic, Gladstone and Arran Banner.

Table 2. Acreage of Certified Potatoes in Wales

YEAR	EARLY VARIETIES		MAINCROP VARIETIES	
	No. of Farms	Acreage	No. of Farms	Acreage
1946	106	316.30	190	660.82
1947	156	438.75	137	448.25
1948	208	649.59	202	887.88
1949	254	615.85	157	414.07

There has been a marked increase in the number of farmer-growers throughout the Principality, particularly during 1948, and the tendency has been for these new growers to concentrate on early varieties.

The decrease in the acreage of maincrop varieties is due mainly to the reseedling policy pursued by Agricultural Executive Committees from 1947 onwards. On these Committee "lands in hand" seed of maincrop varieties were usually grown. Gladstone and Majestic were the favourite varieties, although up to 1948 Arran Peak was very popular in Montgomeryshire.

Growers' Organizations an Advantage One of the immediate problems in the development of this new enterprise was the very small acreage grown on each holding. Seventy-five per cent of the farmers grow less than three acres of potatoes, and such small units create difficulties, particularly in marketing. If the enterprise is to be economic, a market must be obtained amongst the larger, as well as the smaller, early or maincrop potato growers. It is in this sphere that co-operative growers' organizations are successful.

All seed growers naturally have to conform to the regulations laid down by the Seed Potato Certification Scheme of the Ministry of Agriculture and Fisheries. In addition, most societies stipulate certain other rules to be

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observed by their members. For example, new stocks of seed have to be obtained from a source approved by the Society's Committee.

In some societies, growers are advised to specialize in one variety, thus minimizing the risk of impurities. Members of societies are also strongly recommended to spray their crops with sulphuric acid before lifting—usually a 12 per cent solution is used. This operation is carried out by the Machinery Departments of the Committees, and growers are now beginning to make much greater use of this service. In addition to checking the incidence of Blight, acid spraying gives growers an opportunity of controlling tuber size. Acid spraying facilitates early lifting—an important practical consideration on upland farms in relatively high rainfall areas.

It is, however, on the marketing side that the advantage of a good growers' organization is experienced, and the most progressive societies have done much to raise the standard of grading amongst their members. Most of them now stipulate that all seed potatoes (including stock seed) offered for sale have to be graded over a $1\frac{1}{2}$ inch by $2\frac{1}{4}$ inch riddle. Tuber inspection schemes have also been instituted, necessitating inspection—by members of the societies' committees—and the subsequent issue of a Certificate of Grading before consignments of seed are accepted by the societies' agents for sale.

All societies except one—which has its own selling licence—have appointed agents to sell their potatoes in branded bags. Some societies have their own trade marks; Brecon-Radnor Seeds Ltd. very appropriately brand their bags with a red dragon. To cover administrative expenses, societies derive an income from levies imposed on both growers and agents.

During the early years roguing was carried out for farmers on a contract basis either by University students—who did the work during the vacation—or by staff of the War Agricultural Executive Committees. These "teams" were trained by the Advisory Mycologist for the area; although they were very efficient when the areas were small, the expansion in acreage towards the end of the war resulted in their becoming less efficient and rather expensive to employ. The tendency now is for the grower to be responsible for roguing his own crops. Roguing is a specialized job and cannot be mastered quickly. To help in this work the National Agricultural Advisory Service Staff have laid down demonstration plots in the seed-growing areas, where instruction is given to growers or members of their staff. The best growers have by now mastered the technique, but there are still a number who do not devote sufficient time to this all-important operation.

In the early days of seed potato production—before the Second World War—detailed attention was given to the suitability of any area for the purpose. Under the exigencies of war-time farming, with a relatively rapid expansion in the acreage under seed potatoes, there was some concern as to how the health of stocks would be maintained in these new areas. It is gratifying to note that in most areas where reasonable attention has been given to the growing of the crop and to roguing for diseased plants or impurities, stocks have maintained their health for three or four years.

In maintaining the health of stocks, probably the most difficult problem is Leaf Roll. As a result of investigations which will cover a period of years it is proposed to obtain more information regarding the climate and aphid population in these seed potato areas. It is hoped that this information will act as a background for associations to select growers who would be suitable for growing nuclear stocks which would then be distributed amongst the other members of the association. High quality stock seed, particularly if imported into associations from outside sources, is very expensive; and



The First Few

Girls from offices, shops, universities, domestic service, country and city homes enter a new life to serve the land.



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ways been worthy of the ageless traditions of those who have toiled for the land they loved.



Parental Parade, Nottingham Place, October 21st, 1950

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even then there is no guarantee that infection has not occurred after field inspection.

Investigation into Costs During the 1949 growing season the Department of Agricultural Economics, University College of Wales, investigated the costs and returns of seed potato growing in Brecon and Radnor⁽²⁾.

All the growers surveyed were members of Brecon-Radnor Seeds Ltd. : the total acreage costed was 136½ on 36 farms, and this represented 43 per cent of the total acreage grown in 1949 by farmer-members of the Society. The average acreage of seed potatoes per farm was slightly over 3½ acres, rather higher than the average for the whole of Wales. The cost of growing, harvesting and dressing one acre of seed potatoes averaged £62 19s. 6d. over the 136½ acres, but there was, however, a large variation in costs from farm to farm, which ranged from £34 to £88 per acre.

Over all farms, the total yields (seed, ware and chats) averaged 6 tons 8 cwt. per acre, but in individual cases the yields ranged from as low as 2 tons 10 cwt. to 10 tons 8 cwt. per acre. The 1949 season was, however, exceptionally dry, and yields were probably lower than in a normal growing season. The value of the potatoes sold as seed, ware and chats, together with the value of the potatoes retained on the farm, plus the acreage payments averaged nearly £92 per acre. The range, however, was from £34 per acre to £153 per acre. The margin from farm to farm varied considerably and ranged from a loss of £26 per acre on one farm to a profit of £81 per acre on another farm. Of the total of 36 farms, 8 showed losses on the potato crop, and 27 showed profits.

It was considered that the profitability or otherwise of the seed potato crop depends largely on the following factors :

1. *The yield per acre.* There was a definite tendency for crops with high yields per acre to have high profits per acre.
2. *The grade of certification obtained,* which directly influenced the value per ton of the produce. Farms in the "Stock Seed" group had an average profit of £57 8s. 6d. per acre while those in the "A" group showed a profit of £8 4s. 8d. per acre. Of the "A" certificate producers 7 farms sustained a loss, 6 farms made profits of up to £12 per acre and 10 farms made profits of from £12 to £56 per acre.
3. *The costs per acre.*
4. *The management factor,* which had a direct influence on all the above.

Future Prospects and Developments Despite the formation of these seed potato growers' associations on co-operative lines, the total production of seed potatoes in Wales has been small. In most areas where seed potato production has been initiated as a commercial proposition in Wales, the results have on the whole been favourable. Where reasonable care and attention has been given to the growing of the crop, it has been found that a satisfactory standard of health has been maintained, and there is also sufficient evidence that Welsh seed has given results equally as good as the equivalent grades from other sources. In addition, as far as is known, there is no sign of potato root eelworm in the generally recognized seed areas. On the other hand, there is at present an unsatisfied demand for seed potatoes from the early potato growing areas of South-west Wales and Cornwall as well as from the Border and even eastern counties of England.

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There are large areas in Wales which are admirably suited for the growing of seed. One of the difficulties, particularly in the uplands of Wales, is the shortage of labour, especially casual or seasonal labour, but there are a number of family farms where this enterprise can be fitted into the farming system. It should be remembered, however, that seed potato production is a special enterprise. Costs of production are relatively high and to ensure remunerative yield per acre intensive manuring and suitable cultural operations are necessary. In addition, high quality seed should be used, and careful roguing carried out to maintain health and purity. It is equally important to study the market requirements of both the early and maincrop potato grower. Varieties, or even strains within varieties, selected should be popular in the district it is sought to serve, and a well-graded sample invariably ensures success.

The possibilities for the further development of the seed potato industry in suitable areas in Wales are good, and the enterprise should be an attractive and a profitable proposition, particularly to the upland farmer, in that it offers him a very much needed cash crop.

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BETTER SEEDS FOR THE HORTICULTURAL INDUSTRY

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BECAUSE of the need for greater food production during the war and the concomitant difficulty of importing seeds from abroad, seed growing in Britain had to be extended to areas which hitherto had not been regarded as climatically suitable. Production was encouraged and regulated under the Control of Seed Crops Order, 1941. This stimulated effort in growing more of our own seed requirements has continued in a number of places outside the traditional districts, and it has now been found that a large variety of seeds for horticultural purposes can be grown in sufficient quantity in this country to satisfy the demand and compete effectively with imported seeds. Certain seeds can even be produced for export. Handled efficiently, seed growing is an economic proposition.

Information is now being collected on the best methods of soil management and manuring, pests and diseases, harvesting and mechanization, and the maintenance of pure strains. During the war shortage of trained labour and machinery on the growers' side and the fact that the demand for good seed nearly always exceeded the supply, resulted for a short period in poorer quality, but competition and co-operation have done much to raise the standard of quality again. With the increased output per acre of all horticultural

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products, it is vital that the production of all horticultural seeds should be improved still further both in quality and quantity. This can be done only by the concerted action of merchants, growers, breeders and other scientists.

The task is made difficult by the fact that there is a great difference between the finished product as sent to the market and the plant used by seed growers to raise seed. Much can be done to help all sections of the seed-growing industry by helping the grower to raise his yields per acre and the raiser to maintain the quality of his stock seed. Hand in hand with these tasks goes the work of finding the best methods of preventing pests and diseases, which means the right use of insecticides and fungicides. The most efficient methods of cultivation and manuring to obtain maximum yields must also be practised.

Clean Seed Carefully Stored A number of factors need to be considered in sowing seed crops, quite apart from the question of cross-pollination. For example, if onions for seed next year are placed near onion sets, the chances of *Peronospora* (Mildew) appearing in the seed onions are increased; growing beans near gladioli is likely to spread a virus disease to the beans, and the same risk will occur if beans follow gladioli in the rotation; old beds of salsify are sources of infection for White Rust and Mildew to young seed bearers, if these are growing too near. The following steps should be taken to assist the control of pests and diseases:

1. *Rotations should be on as long a term as possible.* Stem eelworm will attack onions, nemesis, iberis, gypsophila, etc. It is most difficult to prevent this trouble spreading once land has been infected. Ground infected with *Verticillium*, *Fusarium* and *Sclerotinia* will cause trouble year after year. The pigmy mangold beetle (*atomaria*) will attack all types of beet and spinach, and these crops should never follow each other on a short rotation.
2. *All materials used to assist cultivation of crops should be absolutely clean.* Bean sticks, for instance, should be stacked in water for one or two weeks immediately before they are used.
3. *Early removal of diseased material is absolutely essential.* Thin-leaved salsify will spread into the other plants rapidly and depress the seed yield. *Phaseolus-virus 2* in beans must be rogued out at a very early stage. Weak and badly growing onion plants constitute a source of infection for *Peronospora* and virus on seed onions.
4. *Good weed control will help to prevent diseases and pests.* A great number of weeds are host-plants for stem eelworm and other insect pests and fungi. All these pests and diseases can ruin a seed crop. Weeds encourage attacks by fungi by preventing free circulation of air around the plants.
5. *Immediately after the harvest, all the remaining plant residue should be removed.* Spent material from broad beans will always be a source of rust infection. In the "steckling" bed of carrots, the fungus *Phomepsis* appears in the foliage. It is not known how this fungus overwinters, but it seems to have a bearing on the failure of the young roots coming into growth in the spring.
6. *The harvested material should have very careful treatment.* When building up stacks or arranging stooking, care should be taken to allow free entrance of air. The fungi *Colletotrichum* and *Ascochyta* very soon attack damp stacks and will render the seed useless. Badly stored seeds have weak germination.

BETTER SEEDS FOR THE HORTICULTURAL INDUSTRY

One of the most important facts for the seed grower to bear in mind is that the best seed can be produced only by healthy and fully developed plants. On the other hand, the quality of the seed decides the constitution of the resulting plant. The most favourable condition for optimum growth and good development of the flowers must exist if plants are to produce first-class seed. It must be remembered that a great number of our vegetables and flowers are not normal products of nature but are either hybrids or sports perpetuated by artificial means. The hearting of cabbage and lettuce, the curd formation of cauliflower and the biennial character of most root crops are not originally normal phenomena but are artificially bred and selected characters. When these crops are grown to produce seed the cultural rules of the market gardener do not always apply. This unnatural characteristic partly explains the occasional off-types amongst even the purest stocks. It must be the aim of the seedsmen to continue by very careful selection to fight against the plant's natural tendencies to revert to its original form. The degree of selection is a personal matter for the raiser and it is here where the difference in strains is noticeable.

The Perfect Sample Assuming that conditions for optimum growth are present and that a good crop of seed is forming on the plant, the next task will be to decide the right moment for harvesting. This is a very variable factor and depends upon the character of the plant. Some seeds have to be gathered before just the right ripeness has been obtained because of the danger of shedding. Many flower seeds have to be hand-picked, as their flowering period extends over a long time. Umbelliferous plants produce so-called "kingheads" that always ripen before the rest of the flowers.

A great number of seeds are gathered with a large portion of the plant attached and must stand for some time to allow the process of ripening to be completed. In this case the crop is tied in bundles and stooked like corn. It is often necessary to complete the ripening in a stack and await the right air conditions before threshing can take place. To obtain a good sample, seeds should not be parted from their protective covering until they are fully matured. It is in this way only that mechanical damage can be reduced to a minimum and the properties of a good sample assured. As well as being of a certain standard of germination and purity, seed should be plump and of even size, the colour should be uniform and the seed should have a distinctive smell.

The correct method to secure this perfect sample is to adhere to the natural processes as closely as is technically possible. In some cases artificial drying is possible but great care must be taken to apply the right temperature at the right time. In using machinery to assist harvesting and cleaning, the grower must be guided by the fact that a seed is a living object and as such can very easily be spoilt by wrong treatment.

The market gardener is well aware of the importance of a good strain, and seeds are becoming more valuable as they have to be more carefully grown and bred. Plant breeders are in the main, concerned with improving existing varieties by rational selection and they try to anticipate the demand of the consumer. Reputable seed-houses are sparing no efforts to maintain the high standards of their strains and the seed-grower is most anxious to fulfil his side of the contract.

Seeds for the horticultural industry can be divided into three sections. The first comprises all seeds that will not mature satisfactorily in this country and have to be grown in a warmer climate. The second includes seeds that

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grow here only under difficulties, and the third covers seeds that produce economic crops under our climatic conditions. It is up to the seed-growing industry to overcome the difficulties of the second and to maintain and improve production of the third.

The horticultural seed group now being established by the N.A.A.S. is endeavouring to assist the industry in these problems.

EARLY STRAWBERRIES UNDER CLOCHES

C. H. OLDHAM, N.D.H.

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THE production of early strawberries by the utilization of glass to induce either an artificial or a natural increase in temperature has long been practised in this country and on the continent of Europe, but the adoption of a cloche, a device consisting of two sheets of glass attached together in the shape of a tent, was a later development. The original cloche was the dome-shaped bell-glass that was extensively used in the French gardening system in England and France several decades ago. The tent type of cloche was first experimented with by a Dr. Parsons of Bursledon, in Hampshire, in 1906, and later some of the local commercial growers adopted this method to enable them to offer early produce in the hope of deriving higher returns from their holdings. Subsequently, however, there was no great increase in production by means of cloches in the coastal areas of the southern counties, for early open-air production was so successful commercially that there was no incentive to obtain earlier crops. A few of Dr. Parson's original followers, however, commercialized the system, and when prices for early outdoor produce dropped about 1922, there was a steady increase of early produce from cloche-covered strawberries; the price obtained for early outdoor fruit was around 2s. 6d. per lb., and this price was fairly constant for about ten days. The decrease in the price of early outdoor produce which occurred during the financial depression between the two major wars caused many inquiries to be made. Production under cloches received much attention amongst strawberry growers in counties favourable to the crop in the southern and western districts.

In recent times many types of cloches have come into use, including those commercially manufactured, as well as those constructed by the growers. The Dutch light was also experimented with, but the majority of experienced growers prefer the cloche to Dutch lights, for the economic use of the latter involves the growing of other crops, the marketing of which does not fit in conveniently with strawberries. It is also interesting to report that while the older established growers prefer the tent type of cloche, the younger generation and others coming into the industry prefer the barn type, which requires the use of four sheets of glass instead of two.

Varieties for Early Production The type of plant used under cloches is important. As a rule the variety which makes a minimum quantity of leaves proves the best. Less desirable are those which fill the cloche with foliage, and those developing long trusses that cause the flowers to be pressed against the glass protection and become "black-eyed" in the event of frost occurring. The latter condition is, however, less important where cloches of the barn type are used. Contrast in

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growth behaviour is seen in the varieties *Madame Lefebvre* and *Cambridge* No. 257, when compared with *Royal Sovereign* and *Perle de Prague*; the foliage of the two latter varieties fills the cloche. It is evident, however, that the choice of a type or variety for cloche production depends upon a number of considerations, as follows:

1. Season of natural maturity.
2. Foliage character—sparse foliage type, as against the leafy type; and development of foliage after covering with glass.
3. Length of truss.
4. Ease of pollination.
5. Size, texture, shape, and colour of berry.
6. Resistance to attacks of eelworm and tarsonemid mite.
7. Resistance to drought and mildew.
8. Resistance to Red Core disease.

It will be seen, therefore, that the ideal plant for early production under cloche protection is very difficult to find. There are indications that the plant breeders are not providing the most suitable varieties for the commercial production of early crops under glass protection. Several of the *Cambridge* seedlings are, however, useful.

In this country there has been little experimentation in the search for new and suitable varieties. The Director of the Botley Experimental Station has, however, taken in hand certain investigations, and has issued a progress report on the work which has been fully described in the technical papers. In the meantime, many progressive growers have largely solved their own difficulties in regard to selecting the most suitable varieties for cloche cultivation.

In the earlier years, *Deutsche Evern* was reliable, but healthy stocks became scarce; afterwards *Madame Lefebvre* held sway but, although this variety was very satisfactory commercially (it gave a high yield of good average-sized berries and did not fill the cloche with leaves), it became very susceptible to Red Core disease. Growers hold the view that if healthy stocks of this variety are obtainable, there would be no need to seek further. All concerned with the strawberry industry, however, are aware that this is a variety of very low quality; yet it has proved commercially successful in all the districts of early production.

After the failure of *Madame Lefebvre*, owing to the spread of Red Core disease and the decline in vigour resulting from the propagation of non-selected stock, growers looked around for another variety suitable for cloche culture. *Perle de Prague* has been grown under cloches for a number of years, and the selected clonal stock has given the best results. Its only fault is that the leaves are apt to fill the "tent" type of cloche; occasionally, also, the berries are rather small and numerous. *Royal Sovereign* gives berries of good quality, but is rather too late to catch the early good prices; also its foliage is apt to crowd the cloche. *Axbridge Early* is definitely very early but is not a good cropper; also, there are many unhealthy stocks.

Certain of the *Cambridge* seedlings have given promising results. No. 422, though not so early as others, has proved useful in several counties, the quality, quantity, size of berry, and general appearance of the fruit being excellent. This variety is superior to No. 448 though not quite so early; moreover the foliage of the latter is apt to be crowded and often there is a pollination problem. No. 54 has given excellent crops under cloches. The berries are large, bluntly conical and, when ripe, of rather a dark crimson colour. Under glass the colour is brighter. No. 257 ripens its fruit very early and is a heavy cropper. The berries are round and produced on short trusses. The foliage is not crowded. It would be an ideal variety for glass protection if the fruit were of better texture and flavour. It should not be

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planted on land infected with Red Core disease. No. 276 in some seasons is not as early as No. 54, but the fruit is of better quality and texture. The berries are long, conical, large and of an attractive crimson. This variety, a derivative of Royal Sovereign, does not fill the cloche with leaves. Although a derivative of Huxley, the habit of No. 173 is distinct, being flatter. The leaves are not numerous and are of medium size; the berries conical in shape, average to large in size, with an attractive scarlet colour.

Propagation Propagation is possibly the most important factor in cloche production. The plants should not only be vigorous but also free from eelworm and the virus diseases. As early runners are needed by the majority of cloche specialists, their propagation should be undertaken sufficiently early to meet the demand. There is little doubt that the growing of early runners should be separate from the production of runners for the normal trade and the production of fruit. As the number of runners taken per acre for cloche growing is less than when the runners are taken in early autumn for the ordinary trade, it is to be expected that they will make a higher price. The block system is preferred, for although a little more expensive in labour, this system gives a better isolation, and diseased plants are more easily seen and removed. Aphid control is important at all stages of growth and also at planting time.

Soil Types and Preparation The best aspect for cloche cultivation is south or south-east; shelter from cold winds is very desirable. Sites exposed to south-westerly gales, unless protected by windbreaks, are best avoided. Some of the warm strawberry gardens on the south coast are excellently protected from wind and salt spray damage by hedges of common laurel or common laurel cherry. These are allowed to grow to a height of 6 feet and a width of 15 inches.

Types of soil can be variable, but those which naturally "warm-up" late in the spring months are not favoured. This condition rules out certain soils of the lower greensands in those counties where this formation has a high water-table in winter. Soils which are freely mixed with gravel are not unsuitable if plenty of bulky organic material has been incorporated. Slightly acid soils are preferred, the most suitable pH being round about 6.5. The drainage system should be free, for any impediment to the drainage of natural rainfall is detrimental. The soil auger should be used to determine the structure of the subsoil. Areas where the annual rainfall is not less than 20 inches are most suitable, but where an irrigation system has been installed this condition would not apply. Where the subsoil is not well drained it is advisable not to use irrigation; soils devoid of organic matter are also not suitable for irrigation.

The preparation of the soil should be complete by late June; the crop may follow early potatoes lifted by mid-June, or a broad bean crop sown in early November and marketed in late April and May. Other croppings prior to strawberries are winter lettuce, which is cleared in early May in the warmer districts, and peas of the variety Laxton's Superb sown in January and marketed in early June.

The nutrition provision should comply with the normal requirement of strawberries; an excess of nitrogen should be avoided. The requirement of phosphate is higher than that of potash or nitrogen.

A soil sample taken carefully over the area of production will be helpful in arriving at the correct manurial treatment. This sample, because of technical requirements in soil sampling should be taken by the District Officer of the N.A.A.S. Soil samples are analysed by a staff of soil chemists

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at each N.A.A.S. Provincial Station, and a report is issued on the result of the examination and dispatched to the sampling officer. This officer is responsible for interpreting the analyses to the grower and for giving necessary advice to correct the nutrition status of the soil for the particular crop that is to be grown.

Having obtained this information and provided the necessary cultivations and manurial requirements, the final operation is to consolidate the soil in preparation for planting.

Planting and Cultivation No reliable evidence is available to indicate the correct time for planting for cloche production, but many growers are in favour of early planting. Others, however, are less particular about the planting time. Although November planting has sometimes proved successful, there is no evidence to show that late planting over a period of years is the most suitable. In the early districts of open-air production, planting in July, August and September has become the custom; planted during these months, the plants develop well and normally carry a good crop the following year. It is wise, therefore, to follow this practice.

Plant spacing depends upon the variety grown and the type of cloche used. For tent cloches a single row with 10 inches between the plants is suitable, but for barn cloches a double row with a 9-inch spacing is often used successfully. Spacing varies also according to the vigour of the variety and the type of soil in which the plants are grown.

The runners should be graded for size and firmly planted. A young plantlet with a number of stout white roots and a bold crown is superior to a fully developed runner with a tangled root system and thin elongated leaves and petioles. Surface hoeing by mechanical or hand methods should be carried out when the plants have settled, the aim being to control weeds and help root development. It is not to be expected that leaf growth will be substantial. High humidity and temperature, together with a moderate amount of sunshine, provide the most suitable weather conditions in the autumn.

No advantage is gained by covering the plants with cloches in late autumn or winter. Occasionally it has been the practice to put the cloches over in November or December, but the crop does not come to the picking stage any earlier by this practice and it may result in the plants suffering from drought before harvest. Normally the best time for covering the plants is early in February, when the crowns are beginning to break into growth. If this is a dry period the plants should be flooded with water, unless the subsoil is clay. The glass of the cloches should be clean, for good light is important even in the south coast areas. It is advisable to give a space of one inch between each cloche to allow for air conditioning and circulation, which improves pollination—a frequent problem in this form of culture. It also enables bees and other insects to enter the cloches and perform useful work as pollinators. The availability of adequate soil moisture is another important factor in cloche production, especially at planting time and in the fruiting period. If, therefore, the area devoted to early strawberries is considerable, overhead irrigation can usefully be installed.

At the beginning of the marketing season, which is usually three weeks before fruit is picked from unprotected plants, all the cloches are removed. There is nothing to gain in keeping the plants covered after this stage, and it hinders the pickers. The fruit is marketed in $\frac{1}{2}$ lb. and 1 lb. punnets, and it is preferable to grade the berries into two sizes. The fruit should be entirely coloured, and picked before the texture is soft.

SELBORNE IN 1950

A. H. HOARE

*See Selborne spreads her boldest beauties round,
The vary'd valley, and the mountain ground.*

THE parish of Selborne lies in the north-east corner of Hampshire, about five miles south-west of the small market town of Alton, the birth-place of William Curtis, the botanist and founder (in 1787) of the *Botanical Magazine* which still appears at intervals. Both topographically and agriculturally the parish of Selborne, which is very large and runs down to the Sussex border, is one of the most interesting to be found in England's delightful south country, and of course Selborne is itself one of the most famous, if not the most famous village in England.

The village lies close against the foot of a great hill, 300 feet high, of the Lower Chalk (hereabouts adjoining the Upper Greensand), which is crowned with a beech woodland, the Hanger, so giving a fine example of the hanging woods found in this part of the country. At all seasons of the year the wooded hill is one of the glories of this ancient village—the soft limpid greens of the early summer contrasting with the rich copper and gold of autumnal days. By way of providing topographic contrasts, the landscape eastwards folds into a tree-filledcombe and southwards falls away with the slopes of the Upper Greensand escarpment to provide far-flung views of distant pine and birch-clad ridges, high against the sky, of the Alice Holt and Wolmer Forest areas on the Lower Greensand. The village stands about 400 feet above sea level and for the most part on a formation of white stone, the Selborne rock or malmstone, a white or greenish-grey calcareous sandstone which in some parts is hard enough to be suitable for building, a fact to which many of Selborne's thatched cottages sturdily testify, and to which Selborne Priory testified during the three centuries of its existence.

Southward from the village lies a great shelf or terrace, as broad here as anywhere in Surrey or Kent, of land derived from the Upper Greensand, giving a fertile soil on which almost the whole range of agricultural and horticultural crops—wheat, roots, grass, hops and fruit—will thrive. (Hops have been grown in the parish of Selborne for more than two hundred years.) This soil, dark in colour when wet and whitish when dry, is known locally as "malm". It is on part of this expanse of Upper Greensand land that the Blackmoor Estate has successfully established fruit orchards and plantations, including an experimental planting of orchard peach trees, the estate having wisely taken fruit culture to the higher land from the more frosty low-lying part of the property below the escarpment. So today there are productive trees of apples, pears and peaches in place of the grape vines which so impressed William Cobbett when he rode this way on August 7, 1823, and put up for the night in Selborne. "I was desirous of seeing this village," he writes in *Rural Rides*, "about which I have read in the book of Mr. White, and which a reader has been so good as to send me. . . . The village of Selborne is precisely what it is described by Mr. White. A straggling irregular street, bearing all the marks of great antiquity, and showing, from its lanes and vicinages generally, that it was once a very considerable place. . . . Nothing can surpass in beauty these dells and hillocks and hangers, which last are so steep that it is impossible to ascend them except by means of a serpentine path. . . . The land is good, all about it. The trees are luxuriant and prone to be lofty and large. I measured the yew tree in the churchyard and found the trunk to be, according to my measure-

ment, twenty-three feet, eight inches in circumference. . . . I have never seen such quantities of grapes upon any vines as I see upon the vines in this village, badly pruned as all the vines have been."

Thus Cobbett, having checked on what Gilbert White had written about Selborne about forty years earlier, did not find the place overrated. "The village of Selborne", White had written in one of his later letters to Thomas Pennant, "and large hamlet of Oakhanger, with the single farms, and many scattered houses along the verge of the forest, contain upwards of six hundred and seventy inhabitants. . . . many of whom are sober and industrious, and live comfortably in good stone or brick cottages, which are glazed and have chambers above stairs; mud buildings we have none. Besides the employment from husbandry, the men work in hop gardens, of which we have many, and fell and bark timber. In the spring and summer the women weed the corn; and enjoy a second harvest in September by hop-picking. Formerly in the dead months of the year they availed themselves greatly by spinning wool, for making of barragons, a genteel corded stuff much in vogue at that time for summer wear, and chiefly manufactured at Alton, a neighbouring town, by some of the people called Quakers; but from circumstances this trade is at an end. The inhabitants enjoy a good share of the health and longevity; and the parish swarms with children."

What was the secret of the young Fellow of Oriel College who just two hundred years ago returned home to take up his first curacy of the parish he loved so well? He was to go away again for a short period (he went back to Oxford for a year to take office as Junior Proctor), but he soon returned to Hampshire where he served in one capacity or another until first he took the curacy of the nearby parish of Faringdon and later again became curate of Selborne, living in his father's house, The Wakes. In those early days he was a "gun and dog" man, as became the fashion of his times. He did not seek preferment elsewhere. Perhaps he had discovered at Oxford that the history of England was writ large in the chronicles both past and present of a single English village. For the historic centuries belong as much to these small clusters of human habitation, which reach back in time even beyond the stocktaking years of the Domesday survey, as to any town and city. True history has a pictorial setting. No history book gives life to the past like the folk-lore and legends, the early flint and metal implements, the encampments of tribal peoples, the names of fields and woods, and the signs of early husbandry to be found in nearly every parish of our land. Gilbert White came back to live and die in the place in which he (the eldest of eleven) was born; but because he had the eye that saw the things of his day, the ear that heard and understood, and a mind that could both contemplate and discern, he himself became an instrument of history and even of antiquity. As James Fisher has written: "It is very fortunate that such a man lived in the parish of Selborne, in the County of Hampshire, in England, in the second half of the eighteenth century."

The Selborne Story Although the hand of time has touched gently this famous English village in the heart of the south country, it would be idle to pretend that the place has undergone no change since Gilbert White's days. Some dwellings have disappeared altogether and others have been altered so that they have a changed external appearance. White might have difficulty even in recognizing his own home, The Wakes, though the row of lime trees which he had planted to conceal the disagreeable details of the butcher's shop across the street, still form tangible link with his years of residence there. However, he would recognize the giant male yew tree in the churchyard, for what are two hundred years in a life which is

said to span a thousand? The arches of those years take us back to Saxon times, but not far enough back to eliminate Selborne. For when the Normans came this way they found a place called *Selesburne* for their Domesday records, and that name could have come from the Saxon *sel* (= great), and *burna* (= a brook or rivulet), referring no doubt to the never-failing natural spring, the Well-head, that emerges from the chalk at the far end of the village. The Domesday men would have been told, too, about the Plestor, the open public space, a play place, in the centre of the village. It is a fair supposition on this evidence that Selborne could have been no mean place, even in Saxon days, to have set aside, as a perpetuance, a piece of its land for *locus ludorum*. For the origin of the name plestor can also be traced to the Anglo-Saxon tongue. In the nave of the church is the Normans' legacy to Selborne—solid stone piers with fluted capitals, obviously designed to carry a more massive structure than they do today.

Priory Farm links Selborne with the medieval centuries, though except for a stone coffin or two occasionally withdrawn from the rich valley soil in which they have lain so long, and a few decorated tiles and fragments of carved stonework, nothing now remains of an Augustinian priory that did not live to see the days of the Dissolution (it was founded in 1232 and suppressed by a Papal bull in 1486). But a walk along the almost hidden lane through the lush meadows of the Long Lythe, where still flows the brook that provided water for the priory's fish-ponds and its corn mill, will bring one to Priory Farm, with its sixteenth century farmhouse, and its names that form a link with the past—Abbey Field and Paradise. In these old Hampshire villages the names have lingered on down the centuries of time. Seven hundred years ago Paradise was no doubt a real paradise—an enclosed conventual garden or orchard pleasantly laid out and planted with fruit trees and vines. And a mile away, Selborne's Gracious Street, which winds away from the main street close beneath The Hanger, and in which there are thatched cottages bearing the date 1793 (the year Gilbert White died), also speaks of the days when Selborne Priory was the centre of local life. Gracious Street calls to mind London's Gracechurch Street and those words of Shakespeare in *Hamlet*: "There's rue for you, and here's some for me: we may call it herb-grace o'Sundays." Gracious cannot be anything else but a corruption of Gracechurch, any more than Gally, the name of a low rounded hill lying to the northwards at the lower end of the village can escape recognition as the place of the gallows—Gally Hill = Gallows Hill—in the days when a Prior held powerful authority over the conventual delinquent.

Thus does Selborne tell its own story to the interested and discerning visitor. Into the winding village street come visitors of all nations; most of all, perhaps, come the Americans. In the soft warm summer air of this southern district they gaze at the great hanging wood, the enormous yew tree, the Well-head and the church's massive Norman piers and circular stone font, and in thought dwell upon that "still, quiet body," the man they know as Gilbert White—naturalist, who saw not only these things but, while he rode about the parish on his cob, so many other things of interest besides. And they think, no doubt, also of the simple smooth English prose which he used to describe what he saw.

The Man and the Book It is a matter of regret that Gilbert White's book about Selborne has so seldom been issued in the form he originally designed. White came to be regarded as a writer on natural history, and usually today the book, much shortened to include only matter relevant to that subject, appears under the title of *The Natural History*

of Selborne. But Gilbert White was not primarily a naturalist, though he was undoubtedly a good field observer of his day, despite the fact that he sometimes drew erroneous conclusions. Primarily Gilbert White was an observer, and a receiver and a recorder of information. His interest was by no means confined to natural history, for his writings have revealed him as a competent antiquarian, a horticulturist and a botanist. Actually his writings began with horticulture, for shortly before taking up his first curacy at Selborne he had acquired Phillip Miller's *Gardeners and Florists Dictionary*, a book which induced him to begin in 1751 the compilation of his own "Gardeners Kalendar," a scrupulously kept diary of the weather, cultivations, sowings, plantings and harvestings concerning his own garden at The Wakes; he kept this diary going for many years. It was not until some fifteen years later that Gilbert White began the correspondence with Thomas Pennant, the naturalist author of *British Zoology* (1766), which, with the correspondence, begun later, with Daines Barrington (lawyer and amateur naturalist), was to provide the material for the natural history part of his book. He kept also a "Naturalist's Kalendar," in which he recorded the songs and the comings and goings of birds, particularly the migrants, and observations on the flowering of plants, and he also compiled a series of notes which he called "Observations in Various Branches of Natural History". He delved into parish history and searched in the muniment chests of Magdalen College, Oxford for information about Selborne Priory. He wrote of the parish's history as he had written of its natural history—in the form of letters to a correspondent.

It is necessary to remember, however, that in the first place Gilbert White did not write for publication. It was his brother, Thomas, and Daines Barrington, who, it is said, between them persuaded him to allow his brother Benjamin, the London publisher, to publish the book which was to make him famous. When the book eventually appeared late in December, 1788, (it bore the date 1789) its author was in his sixty-eighth year. The book's title in this, its first, edition, was *The Natural History and Antiquities of Selborne in the County of Southampton*.^{*} The *Antiquities* has been omitted in most of the later editions (there have been perhaps some 150 since 1789) and the work was resolved into a book on natural history to include the *Naturalist's Kalendar* and *Observations* with perhaps a few odd paragraphs from the "Gardeners Kalendar". One of the most satisfying editions of *Selborne* is the Freemantle edition of 1900, still occasionally obtainable. Published in London in two volumes under the title of *The Natural History of Selborne and a Gardener's Kalendar*, and edited by R. Bowdler Sharpe, L.I.D., this edition is complete and includes the whole of the valuable "Gardeners Kalendar," which is of great interest to horticulturists, and some interesting facsimile reproductions of letters written to Thomas Pennant. Recently a special edition of the *Antiquities* has been prepared by Mr. Sidney Scott with the title of *The Antiquities of Selborne*. The publication of this book, which is reviewed on page 445, marks the first occasion on which the *Antiquities* has been issued as a separate volume. The book contains several very interesting reproductions of drawings made in Selborne and its neighbourhood during Gilbert White's days. Also it contains several other interesting features which the editor has commendably been able to include to add to its general usefulness.

Gilbert White died at The Wakes on June 26, 1793. Had he lived until July 18, he would have been 73 years old. It is strange to reflect that out of

^{*}A copy of the first edition is in the Ministry's library, 8 St. Andrew's Place, Regent's Park, London, and may be seen there by arrangement with the Librarian.

the very obscurity of his quiet existence in this Hampshire village, something came which was destined to keep his memory fresh for ever; something, too, that was destined to give Selborne a unique place amongst English villages. And Selborne has given him what he himself would have asked for—a modest grey stone, low and rounded, bearing the letters G. W., in a corner of its quiet churchyard.

Selected Bibliography

A complete bibliography of Gilbert White would run into several pages, for perhaps the work of no other English writer, except William Shakespeare, has been issued in so many editions. The following, however, are the English editions of bibliographical importance:

1. *The Natural History and Antiquities of Selborne in the County of Southampton, with Engravings and an Appendix*: London, B. White and Son, 1789.

This, the first, edition was dated 1789 but was issued in December, 1788; the author's name is not on the title page.

2. *A Naturalist's Calendar with Observations in Various Branches of Natural History*. Extracted from the papers of the late Rev. Gilbert White, M.A. London, B. and J. White, 1795.

The material for this volume was selected by Dr. John Aikin.

3. *The Works in Natural History of the late Rev. Gilbert White. Comprising the Natural History of Selborne: the Naturalist's Calendar and Miscellaneous Observations extracted from his papers: To which are added a Calendar and Observations by W. Markwick, Esq.*: 2 vols., London, John White, 1802.

This was the first volume which lacked the *Antiquities*, its place being taken by the *Calendar* and the *Observations*. It has formed the basis for most of the numerous subsequent editions of *Selborne*.

4. *The Natural History and Antiquities of Selborne*: Edited by Thomas Bell, F.R.S., 2 vols., London, Van Voorst, 1877.

This edition, regarded by bibliophiles as the classical edition of White's writings, is very complete and contains a memoir on White by the editor, many of White's letters to relatives and friends, one of his sermons, his account book and a facsimile reproduction of his handwriting. It contains also contributions by William Curtis and Lord Selborne.

5. *The Natural History and Antiquities of Selborne and a Gardener's Calendar*: Edited by R. Bowdler Sharpe: London, Freemantle, 1900.

This edition is noteworthy for its completeness and the facsimile reproductions of letters addressed to Thomas Pennant.

6. *The Antiquities of Selborne*: Edited by Sidney Scott, London, Falcon Press, 1950.

This volume is the first separate issue of the *Antiquities* and contains Notes and other Contributions by the editor.

FARMING AFFAIRS

Potatoes—This Year and Next The rains which spoiled the hay and corn harvests enabled the plough to get going immediately the fields were cleared. And throughout October cultivations proceeded "in all the live murmur of an (Indian) summer's day". Mud there certainly was at the beginning of potato and sugar beet lifting. The tubers emerged sticky and wet but by the end of the month the soil had dried considerably and it was generally possible to clamp a presentable sample. Potato growing on a commercial scale has never been popular with farmers of heavy land, and but for a welcome change of weather, lifting, this year, would for them have been practically impossible. They "promise," of course, no greater acreage than national necessity demands, and individual acreages are relatively small. But although the difficulties are greater than on real potato land, there are some compensations. Dung is not lacking

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and no crop responds more generously to a liberal dressing. Blight is generally neither early nor severe, and in our soils tuber infection does not readily occur. It is, therefore, less necessary to adopt the elaborate spraying technique practised under large-scale production. Even in this wet year, with no spraying at all, crops have been lifted with scarcely a trace of disease. And they can usually be stored in a shed or Dutch barn, where the tubers dry quickly. Disease, therefore, is unlikely to develop later. As for the lifting of small areas the old-fashioned plough with its spreading prongs compares not unfavourably with the more modern mechanical outfits. A machine that will automatically pick up, sort and deliver potatoes unmixed with clods or stones has not yet been satisfactorily evolved, and while the spinner may expose rather more potatoes in a given time than the plough, it is rather apt to cause more injury. Indeed for that reason the plough is still preferred in many districts for lifting earlies and seed crops.

Although it is well nigh hopeless to expect any great extension of potato growing in strong land areas, there is probably some room for expansion on light land where, up to now, potatoes have seldom or never been grown on a field scale. The possibility of drought may rule out maincrops, but earlies would seem to be worth consideration. A crop lifted about the end of June or beginning of July escapes severe drought as a rule, and provides a suitable opportunity for a follow-on such as rape, rape and rye or, best of all perhaps, rape and Italian ryegrass. The rape is eaten off (or cut) and rye or ryegrass remains for grazing later. I can personally vouch for the rape and corn mixture utilized in time for further spring cropping. But there are several other possibilities. An Ayrshire farmer has grazed ryegrass up to April and then shut up the crop for seed, harvesting no less than 15 cwt. of seed, per acre, in July.

The time is ripe for an extension of winter grazing by one means or another if only because of the trouble and cost involved in the preservation of summer crops for winter feeding. If the food is there, an herbivorous animal can do its own collecting. Free range will not always be practicable, but there is the electric fence and, for those whose aspirations are more modest, a single uncharged barbed wire set at an appropriate height. To cattle it seems to be no greater a temptation for a jump than an electrified one.

J. G. Stewart

Farming Cameo

3. Newmarket, Cambridgeshire

The Newmarket district almost surrounds Newmarket, though the town itself is in West Suffolk. It contains 70,000 acres of agricultural land, some two-thirds of which is basically chalk, with the ground above about 300 feet capped with Boulder clay, and the remaining one-third adjoining the Isle of Ely is ferland. The average annual rainfall is less than 22 inches, so that the climate is ideal for arable farming, and over 90 per cent of the area is under the plough.

With its broad undulations (not often met with in East Anglia), the chalk area is very pleasant country marked by many plantations and belts of trees, beech in particular. The soils are mainly light and not naturally very fertile; they lack humus and are frequently extremely deficient in potash.

Large farms, large fields and mechanized corn and root growing without much livestock is the general farming picture, with barley and sugar beet the main crops. The high degree of mechanization, leading to very early and timely cultivations, coupled with heavy dressings of fertilizers, produce useful crops from this one-time heathland. Fertility is maintained by ploughing in sugar beet tops and clover or sainfoin stubbles, and by green manuring with mustard or rape.

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The Stud Farms situated around Newmarket, with their large numbers of thoroughbred horses, are an important feature of the area. Not usually very large, the studs are now mainly under grass and divided up into small, well-fenced and neatly hedgerowed paddocks; the small arable acreage usually grows only fodder crops for the bloodstock.

The fenland area, with its deep black soil, almost perfectly flat and with no hedges and very few trees, presents a sharp contrast to the chalk land. Ten years ago inefficient drainage and soft peat roads were the biggest problem, but today the drainage, although costly, is very efficient, and some 24 miles of war-time concrete roads have replaced the old soft droves. With most of the area at about sea level and some even below it, the fens have to be drained by pumping into high-banked rivers which flow slowly to the sea nearly forty miles away.

The soil is admirably suited to growing heavy root crops, being very rich in organic matter but frequently very deficient in phosphates and potash. Unlike the very fertile fens lying to the north of the Isle of Ely, the Cambridgeshire fens are mainly alkaline, and minor element deficiencies, particularly of manganese, are common. The fens are almost entirely arable, the farmsteads usually being situated in the villages on the highland fringing the fen. The main crops are sugar beet, potatoes and wheat and, although yields are frequently very high, quality is not always good. Celery is also grown fairly extensively by a few specialists.

The very light, fluffy peat soil blows very readily when dry, and during the spring, particularly, severe damage is caused in some seasons by high winds blowing away the soil and any seeds or fertilizers sown in it. In a severe blow quite sizeable plants will be blown out of the ground and sugar beet may have to be drilled several times from this cause alone. The most important problem is probably the unparalleled intensity and rapidity of weed growth. The chief weeds—chickweed, cleavers and willow-weed—are all unfortunately rather resistant to existing chemical sprays.

Both potato root eelworm and beet eelworm are present in the fen. Beet eelworm is so far a minor trouble, but potato root eelworm is becoming serious over most of the area, necessitating a restriction in potato acreages.

Vegetable and flower crops, grown mainly by smallholders and small farmers, are found on some of the really good soils in the parishes of Soham and Isleham, whilst at the nearby village of Fordham, outdoor flower growing and the production of fruit trees and other nursery stock is an important horticultural industry.

Though small in area, the Newmarket district includes a wide range of soils and scenery and presents a very varied farming picture—from bloodstock to crawler tractors, and from hundred-acre fields of corn to small plots of pyrethrum, iris and aster.

E. J. Dimock, *District Advisory Officer*

World Dairying The progress made in the post-war rebuilding of the world's dairy herds and poultry flocks is illustrated by the Commonwealth Economic Committee's *Dairy Produce*.^{*} Although the number of dairy cattle has not yet regained its pre-war level, there has, despite the setback of the severe 1946-47 winter in Europe, been a substantial measure of recovery. In Denmark and the Netherlands the 1949 cow population was little smaller than pre-war. The steady increase in the United Kingdom has continued. Dairy herds in Australia and New Zealand have also increased substantially from the low 1945 levels, and in 1949 they were about as great as before the war. In North America, however, a downward trend has been

^{*}H.M. Stationery Office, or through any bookseller, price 5s. net (5s. 4d. by post).

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evident since the end of the war, although an increase is anticipated in both the United States and Canada for 1950.

With many countries continuing to encourage a high rate of fresh milk consumption, production and trade in manufactured products has been slow to recover. The United States, which shipped vast quantities of dairy produce overseas during the war, has remained a more important exporter than before the war, partly through the operation of the European Recovery Programme and partly through increased shipments to other American countries and Asia. The increase in production in Western European countries, particularly Denmark and the Netherlands, is reflected in rising exports, mostly to the United Kingdom, their main pre-war market.

Among Commonwealth countries, which together supply the bulk of the butter and cheese in world trade, Australia and New Zealand have restored their production and shipments to reach a post-war peak in 1948-49. In Canada, there was a decline from the high war-time output.

New Zealand H.I. Ryegrass The Annual Conference of the New Zealand Grassland Association devoted one session to an assessment of the general place and value of H.I. (short rotation) ryegrass. Accounts were given of experience with it in all parts of New Zealand, of which the following short summary may be of interest to readers in this country. (It should be remembered that this refers only to the behaviour of the plant in New Zealand.)

The plant is intermediate in character between its two parents (Italian and perennial) but inclines a little more in likeness to the Italian parent. Its main valuable characteristics are:

- (a) much higher palatability than perennial ryegrass ;
- (b) high productivity over the year ;
- (c) heavier production in winter and early spring ;
- (d) regenerates freely if allowed to seed naturally.

Trials show up to 600 lb. dry matter per acre more production in winter than from perennial ryegrass.

Although New Zealand farmers demand youth in their pastures, they do not like ploughing any oftener than can be helped. The worst fault of H.I. ryegrass in their eyes, therefore, is its lack of persistency. Its length of life will, in practice, depend on : soil fertility, the moisture available, the presence of clover, management, and the opportunity to reseed if it begins to disappear. Its life will be short unless fertility is very high, moisture and clover adequately present, and its management such as to provide for grazing at an early stage during establishment (to get the white clover away) and for periods of rest during utilization. It cannot stand close, continuous defoliation. To some extent, natural reseeding can replace summer moisture in securing a given degree of permanence. The strains of H.I. ryegrass now coming on the market are, however, claimed to be longer-lived than the original production.

Summing up, H.I. ryegrass in New Zealand is useful for the following purposes :

1. as a palatable forage crop on a wide variety of soils ;
2. as a short-lived constituent of pasture on moderate soils, i.e., for very short leys ;
3. as a reasonably persistent pasture plant under first-class conditions of fertility and management.

The type of management required (allowing the plant to get fairly long periodically) is probably more suited to cattle than sheep. On the other hand, the fact that it is so productive in winter and early spring, when

seasonally milked dairy cows are not in production, gives it a value for sheep which it might not have for cows in some areas.

In view of the need for reducing dependence on concentrates in Britain, the ability of H.I. ryegrass to produce well in early spring should not be overlooked. Under suitable conditions this fact might assist, in reducing the period of indoor winter feeding.

Pre-Harvest Testing for Blind Seed Disease of Ryegrass. Blind seed disease of ryegrass is of considerable importance in New Zealand, both from the domestic point of view and in relation to the valuable export trade in seed. In bad years seed crops may be lost entirely, while, after all the expense of harvesting and cleaning, stocks are sometimes found with a germination capacity as low as 5 per cent.

To assist growers in New Zealand, a service of pre-harvest testing is provided. The object is to enable farmers to decide whether or not it is economic to incur the expense of harvesting the seed. If it is not, stock can be turned in or the produce made into hay or possibly the field saved for a later crop of white clover seed. Farmers are encouraged to send in samples (about 300 heads) from individual paddocks. The testing (microscopic examination) is done very quickly by staff from the Dominion Seed Testing Station who are posted temporarily to strategic local offices of the Department in the ryegrass-producing areas. The results are said to be sufficiently reliable for practical purposes, provided sampling instructions are followed by the farmer and harvesting is not unduly delayed; also that no other cause of low germination is prevalent, e.g., mechanical injury, heating in storage, sprouting, etc. The service is free.

Home-Grown Fruit and Vegetables: Discussions have been going on with representatives of all sections of the horticultural industry regarding arrangements to test the commercial suitability

**Identification Mark for
"Recommended" Grades**

of the grades recommended by the Ministry of Agriculture's Advisory Committee on Standard Grades and Packs for Fruit and Vegetables. As a result the Ministry has agreed that growers and packers making trial use of the "Recommended" grades may be authorized, on application to the Ministry, to use an identification mark as shown on trial consignments of graded produce. The Ministry has also agreed that growers, packers and distributors who handle home horticultural produce packed under the "recommended" grades may similarly apply for permission to incorporate the identification mark in advertising material in which the mark is associated with a form of words to the effect that the advertiser supports the use of the National Recommended Grades.



The purpose of this mark is to provide wholesale and retail distributors and the Advisory Trade Panels on the wholesale markets with a ready means of identifying packages containing fruit and vegetables packed to the "recommended" grades, but it must be clearly understood that during the trial

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period the use of the mark does not carry with it any undertaking by the Ministry in respect of the quality of the produce so marked.

In applying the mark, growers and packers will have discretion to vary the size of the mark according to circumstances and to the type of label and package used. The Ministry cannot supply labels or rubber stamps bearing the mark. Users will therefore need to make their own arrangements to have the mark incorporated in the design of their usual address labels. A copy of the mark which will serve as a specimen for the applicant's printer will be supplied by the Ministry at the time of authorization.

It is in the interests of all growers and packers to grade their produce according to recognized national standards. Those prepared to make trial use of the "recommended" grades should apply to the Ministry of Agriculture and Fisheries, Marketing Division, 36 Chester Terrace, Regent's Park, London, N.W.1., for further particulars.

Buying by Grade in Canada Government grading has taken much of the guesswork out of buying, and today the Canadian housewife, buying by grade, can buy with confidence, according to home economists in the Consumer Section, Marketing Service, Department of Agriculture, Ottawa. Many Canadian foods now available on the market are graded according to quality and carry a distinct grade marking either on the container or on the product itself. The grading system is not only of great value to the Canadian consumer, but the producer and the manufacturer also benefit. In many cases the industry concerned has seen the need for standardization and has sought government aid in establishing grade standards. The regulations covering these standards are enforced by government inspection, and violations are punishable by law.

All eggs sold in Canada must comply with Government regulations. Butter is sold according to grade in some provinces only, but 98 per cent of all fruits and vegetables processed in Canada are in plants licensed and inspected by the Department of Agriculture. Samples of the processed food are checked by Government inspectors before the label with the grade mark is put on the package or can. Size of cans is also standardized by law. Frozen fruits and vegetables and dehydrated fruits also must be graded.

The Marketing of Italian Cauliflowers The excellence of marketed Italian cauliflowers is not due to any novel method of grading, packing or transportation; it depends on a number of factors, including production, marketing arrangements, transport, and the influence of the compulsory inspection service of the Italian Institute for Foreign Trade.

A Report on the Production, Marketing and Transport of Italian Cauliflowers has been compiled by the Marketing Division of the Ministry of Agriculture in collaboration with the National Agricultural Advisory Service. It is the outcome of a tour of inspection, by officers of the Marketing Division and National Agricultural Advisory Service, of the three main growing areas in Italy, and deals factually with the cultural aspects of Italian cauliflower production bearing on the growing of good market types; methods of handling, grading and packing; export control; and methods of transportation to foreign markets (particularly the United Kingdom).

Copies of the Report may be obtained free of charge from the Ministry of Agriculture and Fisheries (Leaflet Room), 36-38, Chester Terrace, Regent's Park, London, N.W.1.

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Residual Values of Fertilizers and Feedingstuffs The second report of the Scottish Standing Committee appointed to prepare annual tables of the values to be attached in

Scotland to unexhausted manures and feedingstuffs, has now been published by the Department of Agriculture for Scotland. The Committee adheres to the recommendations made in its First Report, and these have been repeated for convenience. Revised tables of compensation values have been prepared and appear as an Appendix to the Report, copies of which can be obtained from H.M. Stationery Office, or through any bookseller, price 6d. (7d. by post).

AGRICULTURAL INDEX NUMBERS

MONTHLY INDEX NUMBERS OF PRICES OF AGRICULTURAL PRODUCTS
INCLUDING EXCHEQUER PAYMENTS (UNCORRECTED FOR SEASONAL
VARIATION)

(BASE 1927-29 = 100)

	1950			1949		
	July	Aug	Sept.	July	Aug.	Sept.
All Products	216*	235*	241*	209*	224*	224*
Cereals and Farm Crops	225*	241*	220*	225*	237*	211*
Livestock and Livestock Product	212*	233*	250*	203	219	220
Wheat	256	256	256	227	227	227
Barley	231	246	256	233	242	244
Oats	228	226	232	230	221	219
Potatoes	206*†	232*†	184*	223*†	245*†	187*
Hay	196	202	203	174	182	193
Fat Cattle	223	218	212	216	211	203
Fat Cows	195	194	182	183	180	170
Fat Sheep	218	218	208	206	198	196
Fat Ewes	194	191	191	188	185	185
Bacon Pigs	313	312*	313*	277	277	276
Pork Pigs	269	269	269	253	253	253
Sows	228	228	228	204	204	204
Milk	202*	241*	268*	193	224	244
Butter	105	105	112	86	86	86
Poultry	241	237	244	235	246	238
Eggs	206	217	257	206	206	227
Store Stock ‡						
Dairy Cows	171	177	182	178	179	183
Store Cattle	214	206	211	221	219	208
Store Sheep	220	237	208	218	216	194
Store Pigs	414	412	414	295	291	291

* Provisional. † Based on corresponding months 1927-29.

‡ Not included in general index.

THE MINISTRY'S PUBLICATIONS

Since the date of the list published in the September, 1950, issue of *AGRICULTURE*, (p. 295) the undermentioned publications have been issued.

Major Publications Copies are obtainable at the prices mentioned from the Sales Offices of H.M. Stationery Office or through any bookseller.

Fixed Equipment of the Farm. Report of Conference at Winchester (1950)
(New) 1s. 9d. (1s. 11d. by post).

Smallholdings Centralized Services. Report and Accounts for 1948-49.
(New) 1s. 6d. (1s. 8d. by post).

Advisory Leaflets Single copies of not more than 16 leaflets (four in any group) may be obtained free on application to the Ministry, 36-38, Chester Terrace, Regent's Park, London, N.W.1. Copies beyond this limit must be purchased from the Sales Office of H.M. Stationery Office, net price 1d. each (2d. by post), or 9d. per dozen (11d. by post).

Group I *Livestock and Dairying*
No. 300 Growing Field Peas for Stock Feeding (*Revised*)

Group II *Pests and Diseases of Farm and Horticultural Crops*

(a) *Insects and Other Pests*

No. 109 Flea Beetles (*Revised*)

No. 235 Chafer Beetles (*Revised*)

(b) *Fungi*

No. 370 Cauliflower Mosaic (*New*)

Group IV *Birds*

No. 229 Goldfinch, Chaffinch and Greenfinch (*Revised*)

Group V *Weeds*

No. 47 Stinging Nettles (*Revised*)

Group VI *Other subjects*

No. 360 Outdoor Tomatoes (*New*)

No. 366 Ants in the House (*New*)

No. 374 Precautions in the Use of Insecticides, Fungicides and Weed-killers (*New*)

Animal Health Leaflets. These leaflets are obtainable under the same conditions as for Advisory Leaflets (see above)

No. 41 Blackquarter, Quarter Ill or Black Leg. (*Revised*—superseding A.L. 6)

Growmore Leaflets. Issued free of charge only by the Ministry, at 36-38, Chester Terrace, Regent's Park, London, N.W.1.

No. 103 Approved Hypochlorites in Milk Production (*Revised*)

Farm Machinery Leaflets. Issued under the same conditions as Growmore Leaflets (see above)

No. 7 Tractor Engine Overhaul (*Revised*)

Unnumbered Leaflets. Copies are obtainable free of charge from the Ministry only, at 36-38, Chester Terrace, Regent's Park, London, N.W.1

Fire Prevention on Farms

BOOK REVIEWS

The Antiquities of Selborne. GILBERT WHITE. Edited by Sidney Scott. Falcon Press. 13s.

The original, i.e., the first, edition of Gilbert White's book about Selborne, published in 1789, carried the full title of *The Natural History and Antiquities of Selborne in the County of Southampton*. Of the subsequent editions, many omitted the *Antiquities*, so that the author became best known as a writer on natural history; indeed his book more often than not has borne the title: *The Natural History of Selborne*. But Gilbert White was as competent an investigator of local history as he was of natural history and wrote equally well about both. Many will therefore be pleased to find that the *Antiquities* has now for the first time been issued as a separate volume, well printed and handsomely bound. Their pleasure will be heightened by the editor's decision to print all the poetry that Gilbert White wrote, including that pleasing piece "The Invitation" (to Selborne) and the delightful little sonnet on crocuses that appeared in the first edition of *Selborne*. The editor has further enhanced the value of the book by including a topographic and historic account of the parish and the old directions for The Perambulation or beating of the bounds. There are also interesting extracts from an account written by the first Earl of Selborne on the Romano-British antiquities of the district in which Selborne lies. With many previous editions of White's book the "editor's notes" have provided an interesting running commentary. In this instance, the editor has given his notes, together with the few that White himself originally included on the *Antiquities*, at the end of the book, conveniently linked with the text by numbers.

The book is illustrated with 12 reproductions of wash drawings of Selborne made in 1776—during White's life.

I found this book of considerable interest, the measure of which may be gauged from the admission that I read it twice within a week. How often the history of our country parishes reflects the rich pageantry of English history! There are country villages whose records, often spanning a thousand years, are a microcosm of English life. Selborne is certainly one of them, and this book, a legacy of Gilbert White, is doubly welcome on that account.

A.H.H.

Sold for Two Farthings. F. D. SMITH and BARBARA WILSON. James Barrie. 15s.

The awakening of the social conscience which condemned man's inhumanities to man has not yet extended completely over the wide range of man's inhumanities to animals. That cruelty and indifference to suffering continue to exist in civilized society is both illogical and an indictment of our education and sensibility. The Biblical allusion to the five sparrows sold for two farthings poses the question of man's right to control the life and attendant circumstances of all classes of animals and their subordination to the economic needs of society. The resolution of that question will keep men arguing for ever.

Certain practices in animal husbandry, such as castration, branding, ringing, and ear-marking, come by their very normality to an easy acceptance, although improvements in the design of implements have been, and no doubt will continue to be, made with the aim of inflicting as little pain as possible upon the animal. Thus the nose of a pig or a bull may be ringed to secure its control, but the same practice applied to a collie dog inclined to be fierce with cattle brought its owner into court, where he was found guilty of cruelty, fined and ordered to pay costs. Most people will unhesitatingly agree with the court's decision, but, ask the authors of this book, since a dog that cannot be controlled must be destroyed, "at what point does the pain of using methods of control become worse for the dog than destroying it?"

Often there is less sympathy with pain inflicted on vermin, presumably for the illogical reason that they are vermin. Then one has to decide what is "vermin". Fox-hunting and stag-hunting have their opponents, yet frequently, for no clear reason, the "runnable stag" commands wider sympathy than the harried fox.

The authors have dealt very fairly with their difficult subject, by quotation from the national, farming and local press, Hansard, books and articles, and by personal interview with countrymen and others concerned with the care and welfare of animals, the whole linked by thoughtful, but never dogmatic, commentary. The great merit of this book is that by its restrained treatment it will stimulate thought and encourage discussion. Only so can public opinion be crystallized.

S.R.O'H.

BOOK REVIEWS

The Mechanical Equipment of Farms. J. C. HAWKINS. Farmer and Stock-breeder (Spon). 21s.

It is interesting to know how farm machines are designed and made, and it is important to know how to keep them in good order so that they give long and efficient service; and now that some of our more newly developed equipment is so elaborate and expensive it is becoming essential to know how to use the machines to the best advantage, to know how to select them for their job and to fit them into the general economy of the farm. This book by Mr. Hawkins is intended to help chiefly in these last problems. The advantages and disadvantages of the various types of machines are pointed out, and some idea is given of the general circumstances in which each machine is likely to prove to be worth while. The economics and finances of farm mechanization are kept in the fore-front of the discussions, and the chapter on the selection of machinery for the farm has a most useful section giving examples of the machinery likely to be needed on some common types of farm. The approximate current list price of the equipment specified is given in each example, in order to provide some idea of the kind of capital needed to equip farms with new machinery. The farms chosen as examples are a 70 acre mixed farm, a 190 acre dairy farm, a 250 acre hill farm, a 285 acre mixed farm and a 550 acre arable farm. The examples give not only a list of the machinery needed, but some brief details of the crops to be grown and of the stock to be carried. The fact that the figures show that as much as £16 per acre needs to be spent on equipping some of these farms with the necessary machinery emphasizes the usefulness of a book that will help the reader to spend the money wisely. Harvesting with combines is treated in some detail, and so is the handling and drying and storing of the grain. A useful bibliography is given to direct further reading in several languages.

H.J.H.

Good Sheep Farming. N. L. TINLEY. English Universities Press, Ltd. 4s. 6d.

In recent years, men of wide experience and knowledge of the sheep industry, such as Allan Fraser and J. F. H. Thomas, have furnished flock-owners, shepherds and students of sheep husbandry with authoritative textbooks. Yet there is need of, and would be room for, a handy, compact, well-balanced, clear and inexpensive introduction to the subject that might also serve as an elementary reference book. This latest of the "Teach Yourself Farming" books follows the format, at the price, of the series, but unfortunately, in my view, it does not attain a high enough standard in other respects to go far to meet this need.

The author has undoubtedly a thorough experience, practical and scientific, of sheep farming in the south-east of England, but in attempting to impart an elementary yet comprehensive knowledge of the many systems of sheep husbandry, and of the complex structure of the industry in this and other countries, his treatment of available information tends to be unbalanced and uncritical; virtual irrelevancies occupy too much of his limited space.

There are, too, many blemishes, misprints, errors, and unnecessary repetitions. For example, the author points to additional information in a list of references—there is no such list. The definitions of certain terms, e.g., shoddy and mungo, stated to be included in the glossary have been omitted. A map purporting to show the distribution of British breeds of sheep (Fig. 3, p. 29) is inadequate and misleading for many of the important breeds. Much work has been done on British wool since that of Barker in 1931. The crosses, Greyface, Masham, and Halfbred, are out of place in a condensed description of breeds; and the significance of cross-breeding in sheep production surely merits more than one page and six lines of discussion in a text of some 170 pages.

J.E.N.

The Daffodil and Tulip Year Book, 1949. The Royal Horticultural Society. 8s. 6d.

The Lily Year Book, 1949. The Royal Horticultural Society. 8s. 6d.

The Rhododendron Year Book, 1949. The Royal Horticultural Society. 8s. 6d.

In his foreword to the fifteenth edition of the *Daffodil and Tulip Year Book*, Mr. E. A. Bowles states that the contents contain "a long list of articles by so many experts in so many aspects of the history, breeding, cytology, growing and showing of Daffodils and Tulips..." that the reader is assured of a wealth of information. The new classification of daffodils is most clearly set out in the various divisions and the main differences between the old and the new systems are considered. Those growers and exhibitors who were once so familiar with *Incomparabilis*, *Barrii* and *Leedsii*, will now find the new divisions much more lucid once they become familiar with them. The "Change of Taste in Daffodils" provides interesting reading, and it is noteworthy that the King Alfred yellow trumpet is still popular, despite the fact that it has been on the market for half a century; but the increasing demand for the whites may eventually prove too great a rival.

Although the Tulip Section is comparatively small, the articles are extremely interesting.

The dedication of this volume of *The Lily Year Book* to Robert W. Wallace, V. M. H. shows how a man, who, though in a totally different sphere of life, found the culture of lilies, orchids and other genera so absorbing that he gave up his practice as a consulting

BOOK REVIEWS

physician in order that his whole time might be devoted to the pursuit of further knowledge in the care of these most floriferous bulbs. The reading of this volume may not produce such ardent enthusiasts, but certainly even the pure amateur will find many very interesting articles of a very wide range. The more scientific mind will find "A New Classification of the Genus *Lilium*" by Harold F. Comber well worth careful investigation. Some of the rather unorthodox views which form the basis of the new classification may cause considerable argument among the older schools of thought, but this new arrangement emphasizes, at any rate, the very considerable agreement between certain species which is not brought about by the orthodox method based on flower shape. The plant breeder is catered for by an article on "Hybridising in New Zealand" by L. Tuffery, and the beginner by "Lilies for the Amateur," by W. A. Constable. Some forty-three excellent photographs depict many of the new hybrids and species as well as two groups showing the staging of lilies for exhibition.

The fact that this fourth volume of *The Rhododendron Year Book* is sub-titled "Conference Number" ensures that the reader has a full report of all the papers read at the Rhododendron Conference arranged by the Royal Horticultural Society in April, 1949, and in addition, glowing accounts of the ten-day tour which carried some three coach loads of enthusiasts to some of the most famous gardens in southern England and Wales. "Rhododendrons in the Wild" by F. Kingdon-Ward, V.M.H., leads the reader into the wilds of the Eastern Himalayan regions and its extensions into China, Tibet, Assam and Burma and here, "where rain and mist are everlasting, and the snow lies deep and long, one will seek the greatest concentration and the greatest variety of species". By way of contrast, the President of the Royal Horticultural Society, Lord Aberconway, deals with "Rhododendrons in the Gardens." That he is an enthusiastic rhododendron lover is clear from his concluding paragraph, where he says that "no group of plants gives a larger dividend of beauty and of interest for a smaller outlay of capital and labour than the great race of Rhododendrons". A lengthy and scientific review of the rhododendron by Dr. J. Macqueen Cowan will provide food for thought for even the most ardent enthusiast, while the more practical minded will find some useful information on reading through F. E. W. Hanger's articles on propagation. A reminiscent mood is obtained after reading the account of 1949 Rhododendron Show. The glories of the various trade exhibits are lucidly described and full records are given of the various competitive classes.

H.S.C.C.

Plant Breeding. A. L. HAGEDOORN. Crosby Lockwood. 12s. 6d.

As the companion volume to Dr. Hagedoorn's now well-known *Animal Breeding*, this very readable book should enjoy a wide circulation amongst professional and amateur plant breeders. It is not often that a breeder is able to draw upon an experience of work conducted in several countries with such a variety of crops, and in a book of this size (237 pages) it is an accomplishment to have included so many aspects of principle and practice. To this is added, as in the nature of a corner-stone, some reflections on the social and political repercussions of certain lines of plant improvement, which widen this already comprehensive and intriguing subject.

The author has helped the reader considerably by dividing the text into three parts, the first deals with theoretical questions, the second is devoted to practical considerations, and the third and final part discusses breeding in certain special groups. The examples used throughout to illustrate different points are drawn from his personal experience, and for this reason are all the more convincing.

In a work which very rightly and in a wide sense emphasizes the fundamental requisites of breeding organization, it is perhaps invidious to select any one topic for comment. But it is interesting to note what an authority with experience gained under several ecological conditions has to say on the breeding value of imported material. Frequently, Dr. Hagedoorn says, this may possess no economic value in the land of its adoption, but it may possess just one character which, when included in certain native varieties, will, as in the case of certain fungoid diseases, add the highest degree of resistance where such is absent in all native material. Thus, in a truly comprehensive scheme of plant improvement, provision for such an eventuality is imperative.

It is inevitable that limitations of space sometimes leave the reader wishing for more to complete the picture. For example, in Chapter 14 the author quotes the results of a mixture of two similar wheats which yielded 10-15 per cent more than the individual varieties grown separately. Since we in this country would be amply satisfied, at least as a first step, if any of our hybrid productions increased their yields by 10 per cent, a fuller explanation of the underlying reasons for the improvement would have been greatly appreciated. The result, if it were general, would give us an immediate line on that increased production which is so fully engaging our attention at the moment. But nothing that is said under this heading detracts from the usefulness of this extremely interesting and stimulating book.

H.H.

BOOK REVIEWS

The Plums of England. H. V. TAYLOR. Crosby Lockwood. 30s.

The plum has received remarkably little attention from research workers or writers, and a book drawing together all the available information was needed by students, market growers and amateurs alike. Words provide a cumbersome, though necessary means of describing the minute characters of different varieties of fruit trees if a clear mental picture is to emerge from them. Coloured illustrations, of the standard found in this book, are really essential to bring to life the description, however good. The photographs are really excellent and for the most part faithfully reflect the characters of different varieties. The picture of the Victoria plums does not perhaps do full justice to the lusciousness of which good Victorias are capable, and the colour of the Cambridge gages seems a little unreal; but these are minor imperfections in a gallery calculated to make any reader's mouth water.

The book is divided into two parts. The first, intended for the general reader, deals with original species and types of plum, rootstocks, pollination, methods of cultivation, ecology, diseases and pests, and preservation of the fruit. Part 2 is largely devoted to a clear and simple description of the main varieties in cultivation. Incomplete as some of the descriptions necessarily are, the specialist will find here the most comprehensive catalogue of plum varieties yet published. He may or may not agree with the author's conclusions regarding the origin of some varieties (there are good grounds, for example, for thinking that Pershore Purple is a seedling and not a bud sport).

The chapter on diseases and pests is rather loosely written and might be improved on revision; summer treatment of red spider, for instance, is not dealt with and no spray formulae are given, except in the summary. Chapter XI, "Some Chemical Facts," could be omitted without loss, and the bibliography and literature section might more suitably precede the index at the end of the book.

It would be too much to claim that *The Plums of England* reaches the standard set by the author's earlier book, *The Apples of England*, but it is none the less a book which anyone interested in plum varieties will want to own.

L.F.C.

The Production of Field Crops. (3rd Edition). T. B. HUTCHESON, T. K. WOLFE and M. S. KIPPS. McGraw-Hill. 27s.

The series to which this book belongs are standard textbooks for American undergraduate students; and the references at the end of each chapter, giving the sources of the text and indicating suitable further reading, are of special value to readers who have access to American college libraries.

First published in 1924, this book was prepared in line with a syllabus drafted by the American Society of Agronomy, and devotes considerable space to fundamental plant science before treating the field crops individually. The new edition takes into account the mechanization of farming that has developed since 1924, and incorporates recent advances in knowledge of weed control, seedbed preparation including stubble mulch farming, silage-making, green manuring and forage crops, including the less-known clovers, e.g., Ladino, Lespedeza and Melilotus.

The book is well written and amply illustrated, and should secure a place in every agricultural reference library. It supplies concise authoritative information on the warm-climate American crops—maize, peanuts, soybeans, sorghums, millets, cotton, sugar cane, tobacco and sweet potatoes—but it also deals with general principles and with American practice regarding crops common to both America and Britain. Teachers, students and farmers might all read with interest transatlantic conceptions about tillage, seedbed preparation, weeds, rotations, pasture management, haymaking, grain harvesting and the cultivation of sugar beet, potatoes and alfalfa.

The chapters on the economics of crop production and adaptation of crops are valuable additions to the topics ordinarily discussed in books of this type; those on seedbed preparation and tillage, however, and the results of cultivation experiments, mainly with maize and with wheat under low-yield conditions, do not throw much light on the working of land for root crops and small seeds on the British farm. The grouping of barley, oats and rye in the same pH range is not abreast of our knowledge of soil acidity, but we may have to add plantains and yellow trefoil to our list of indicator plants.

The notes on the grasses and clovers familiar to us are interesting, though American farmers do not appear to have the benefit of special strains such as our "S" types. "In favourable weather the hay crop may be cut in the morning and stored in the afternoon, but usually the crop is cut one day and stored the next." On the other hand we learn that "in warmer areas the (sugar beet) roots are not usually sufficiently rich in sugar to make them profitable in sugar-making".

J.R.B.

BOOK REVIEWS

Both Sides of the Road. SIDNEY ROGERSON and CHARLES TUNNICLIFFE. Collins. 21s.

There must be many people who travel into the countryside and who wish they knew more of what is going on over the hedge. In *Both Sides of the Road*, Sidney Rogerson has not only been bold in attempting a book to cover a wide field, but has successfully given the reader a good working picture "about farming".

Early in the book, Mr. Rogerson informs his readers that the general effect of our farming "is no accident"; an apt remark, which he qualifies by explaining the reasons for the various land cultivations, and again stating a basic principle which every farmer must follow—"unless he puts back what he takes out, his land will lose heart". In other words, farming is not just sowing and reaping.

With a general audience in view, the author gives a simple introduction to soil science; outlines the importance of improved grassland and its management and a good lesson in crop identification. All of the different breeds of our horses, cattle, sheep and pigs are described in a way which facilitates easy recognition for the townsman and helps him to understand how and where they fit into the complicated pattern of our farming.

Mr. Rogerson constantly reminds the reader that he can only set down a few facts and . . . "if you are interested to know the why and wherefore of dairy or beef farming . . . you must follow them into the farms and the show pens". In fact, you must go and see for yourself or gain practical experience, if you want all the answers.

The agriculturist, however, will query some of Mr. Rogerson's remarks, but the author disarms criticism by admitting at once that he will probably have critics among the professional. The book is for the general reader, and Mr. Rogerson is to be congratulated on having packed a mass of material into easy reading.

The book is beautifully illustrated by Charles Tunnicliffe. There is a depiction of a farming scene on almost every page. The black and white sketches are not only excellent in themselves, but really do illustrate, and not merely adorn the script. Amongst others, the illustrations of the sheep are good,—the portrait of the Border Leicester ram in particular. The colour prints are free from artistic licence and are faithful to the study.

To the townsman it can be said, when next you return from a week-end trip into the countryside and decide that you would like to know more of the life of your country cousins, read *Both Sides of the Road*, where the farming calendar unfolds itself.

P.J.O.T.

Canning Practice and Control (3rd Edition). OSMAN JONES. Chapman and Hall. 36s.

This book is one which should be available to any food chemist or factory manager in charge of canning in this country. Though the subjects covered are very wide, ranging from the lay-out of a factory and its equipment and disposal of waste, to the chemical and microbiological control, it is clearly written and well illustrated, so that it is of interest to the layman as well as the canning specialist, who needs to know something of each of these subjects.

Those familiar with the second edition of the book will find that this new printing contains additional sections on the manufacture of tin-plate and its effect on the food, useful tables giving the dimensions and capacity of the different sized cans used for various foodstuffs, and a section on the estimation of two vitamins by microbiological assay. By omitting less important matter, these and a few other additions have been made without increasing the size of the publication.

Although an outline of the methods employed in canning various foodstuffs is given, no details such as processing times are included. There are, however, other books which cover this side, which the newcomer should have no difficulty in finding with the aid of the useful bibliography at the end of each chapter.

About one-third of the book is devoted to the chemical control, including planning the lay-out and work of a laboratory, factory water supply requirements and methods of testing this, and tests for some of the more important raw materials and finished products. Most experienced chemists will no doubt have their own preferences for methods of analysis of the latter which may not always be the same as those suggested, but those given should prove useful and reliable.

The large section on microbiological control is of great value in collecting together descriptions, microphotographs and methods of culturing the commoner types of bacteria and moulds likely to be found in canned foodstuffs. The details of the technique of sampling and preparation of suitable types of media should be of great value to the food chemist with only a limited knowledge of bacteriology. Sections on cannery hygiene and food poisoning are reminders that all the personnel employed in handling food must play their part if a high standard of product is to be maintained.

B.A.C.

BOOK REVIEWS

Science in Agriculture. JOHN W. PATERSON. Longmans, Green. 8s. 6d.

In this relatively small book the author has covered an enormous range of matters of agricultural interest, and has introduced students to many of the sciences relating to agriculture. So well is the book written that it "whets one's appetite for more" and when another edition appears it would be even more helpful if at the end of each chapter the author would suggest books that could be used for further study on the same lines. Although this book was first published in 1938 the author has wisely added further chapters in this new edition, on mechanics and weeds. The chapter on weeds, however, would have been improved if more photographs had been included and if those used had been better reproduced. This criticism applies to all the photographs in the book. They are good blocks spoilt to a certain extent because they have been used on inferior paper. And one cannot help commenting on the fact that most of the implements shown are for horses, whereas the modern tendency is to use most of these implements with tractors.

This book traces the growth of plants and crops, manures and manuring, and devotes a small space to livestock. It would seem desirable, if it were possible, to increase the amount of space allocated to farm animals and to add a chapter on poultry.

Although the above criticisms may appear numerous, they are relatively small compared with the amount of excellent material in the 294 pages. This book can be strongly recommended as a first textbook for students requiring a general introduction to the subject of the sciences of agriculture.

F.H.G.

Cabbages and Cream. V. M. FITZROY. Allen and Unwin. 12s. 6d.

Married women are said to be reluctant to put anything of their natural lives on paper, but this is not true of Mrs. Fitzroy. She delights in it; she has much to say, and she says it well. She succeeds in presenting a refreshingly real picture of family life, with herself as the hub of her own small universe, controlled in that miraculous fashion which only women seem able to achieve—careless maybe, and sporadic perhaps, but the core of it is the core of a nation.

Cabbages and Cream is the story of the acquisition of an old farmhouse and its conversion into a home and the centre of farming activities which are very real, if something varied and small-scale (but then Mrs. Fitzroy makes it clear at the outset that her husband was a Reluctant Farmer, such farming as he undertook being more or less forced upon him by the exigencies of war-time living).

That the story of *Squirrel's Leap* takes place in South Africa is in a way, immaterial, since farming is much the same in essentials wherever it goes on. It is interesting just because it brings out the fundamental similarities against a so very different background. Breeds of cattle are different—but the search for a bull when a heifer needs him is the same the whole world over.

But although farming as such does come into *Cabbages and Cream*, it is primarily a book for farmers' wives, since the author's concern is first and foremost the house as a home, to be fitted, furnished, and contrived for the business of family life. Her story of a visit to the Anti-Waste Depot (apparently a glorified bring-and-buy salvage depot) is mouth-watering: a wrought-iron firedog for a penny, and an old baking tin which she acquired for threepence and found to be solid brass when she started to clean it! "One man's junk is another man's treasure," she remarks, and how I agree with her!

E.M.B.

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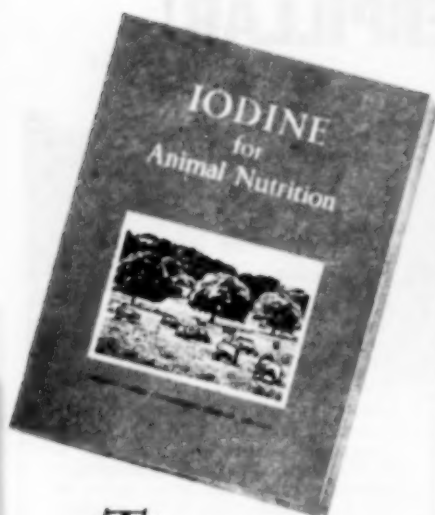
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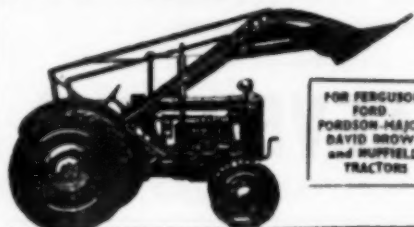


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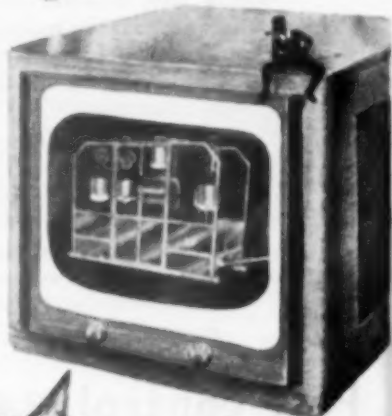


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